# SUPPLEMENT.

# e Minima Vonnal,

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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### Original Correspondence.

IMPROVEMENTS IN PUDDLING IRON.

THE AUTHOR OF THE BOOK "ON PUDDLING."

ao commercial question at the present time of so much im-large as that of cheapening the mode of purifying crude

conversant with puddling iron will admit that nestion is of paramount importance. It is also a question munder the consideration of the elite of iron manufacany years, and on which a large amount of money has ed, yet it still is an unsolved question. My opinion on for some years has been that when the science of pudreperfectly understood there will be no difficulty in beinery to perform it, and when the action of the ma-meted that it will communicate to the iron the kind of in required in the process, then this important question to far an easy and satisfactory solution. I am aware that an pudding are regarded as very peculiar, to which I hey are of a practical character, have stood the test of and can be relied upon.

way by which the present mode of purifying crude iron record is by reducing the cost in materials and labour.

way by which the present mode of purifying crute from agened is by reducing the cost in materials and labour. pal materials chargeable to the process are fuel, fettling. There are three ways by which the cost in fuel can be by complete combustion of the coal used, by rendering to the process the heating power stored up in the pig-iron, lising the waste heat that escapes from the furnace. It may plain to all concerned in puddling that the whole of the yeal is not consumed, but that much of it is wasted in the ry plan to all concerned in pudding that the whole of the bles. The carbon thrown away as refuse in the ashes has great a calorific value as the part of the coal consumed, perly treated, is capable of doing nearly as much work at part of pig-iron that is puddled there is an indefinite f carbon, both in the free and combined state, and when dinto molten iron of this description for the purpose of rotherwise, it raises an intense heat, as may be seen in her process. In fining iron in the ordinary way the heat anno morten from or this description for the purpose of irotherwise, it raises an intense heat, as may be seen in mer process. In fining iron in the ordinary way the heat is unavailable for puddling, except what is retained in where, at some places, it is run from the fining into the furnace. By fining the iron in the way I shall describe a uperature is raised, and is available for heating the pudmer. Although much of the coal used is wasted in the sevident that more heat is given out by that part which ned than is rendered latent in melting and puddling a iron. It must be apparent to all who observe what goes adding-furnace that the heat is more intense in the flue is wasted than in the furnace, and that the heat thus wasted of doing more work. If, then, I completely consume the if I apply to useful purposes the combustible matter conthepig-iron, and if I get double duty from the fuel by one charge with the waste gases escaping from the melting I maintain that such will reduce the cost in fuel.

In the boiling system is essential, but, if it is not suitable, ious to the quality of the iron, and a cause of loss in quan-

in the boiling system is essential, but, if it is not suitable, ious to the quality of the iron, and a cause of loss in quanalso a very expensive material in puddling. Though it is to use it in boiling pig, yet crude iron can be converted nalleable state better without it, therefore its attendant ld be dispensed with. The use of fettling is now regarded se of profit, but this wants confirming.

\*\*sno evidence to prove that graphite becomes carbide in neither is there any appreciable amount of iron reduced fettling, either in an ordinary or patent furnace, and if the oxidised to the highest point, so as to form carbonic acid, ustead of an increase of yield, an extra loss of iron. Iron, nkly confess that in this item there is a great difference the cost per ton by my system and another I will introduce, rican Commissioners, to show the advantages of Danks's ompared the cost of producing a ton of puddled bars by it cost per ton by the ordinary furnace. The balance was ton in favour of the American furnace; but the Comercial of the providence of the provenent, and that the local contents are reached to the considered Danks's furnace capable of improvement, and considered Danks's furnace capable of improvement, and that when 10 charges per shift of 10 cwt. each could be t would effect a further saving of 5s. 4d., making a total; accordingly, he made the following "speculative estits with this I compare mine:—

DANGS SYSTEM.

DANKS'S SYSTEM.									
elting pig-iron in cupola in wages, cok-	å	e.					£0	6	0
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er purposes	. 0	4	0	0		-	0	2	6
***************************************			0	15	at	208.	0	6	2
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BAYLIS'S SYSTEM.									
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ouddling	0	12	0			5s.6d.		3	4
er purposes	0	4	0	0		-	0	1	1
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***************************************			****	***			0	5	6
100000							£3	13	3
ire							0	7	3

pperation. The furnace consists of melting, fining, and Parts respectively. The melting has three tuyeres at the hopper on the top for coal, with a draw-bar at the bottom. has no grate, but a hearth, with a kind of well similar to mace. The fining part is specially constructed with water and tuyeres for blast, set very near the bottom. The is of a circular form, it has the drawing door at the end, by a stoper hole on one side, so that it can be worked as a On each side of the door frame at the end is a small ng into a main. This arrangement prevents the cutting from acting upon the iron, and as the plenum and tempera-

side, and half way through the top of the furnace, through which the puddling tool is introduced and taken out. This is closed with suitable doors. When necessary the slide bar is drawn out of the hopper, and the coal falls instantly over the tuyeres. The iron is charged in a minute or so, by means of a crane and peel, through an ordinary puddling door. When the charge is melted it is run into the fining, and another introduced. The air being forced into the iron near the bottom, has to permeate it to escape at the top, and as it does so the oxygen comes in contact with the carbon, and raises an intense heat, not only in the iron but also in the surrounding chambers, and thus it becomes a source of economy in fuel. I will remark here, that as a practical finer I have made as good fine metal in this way as ever I have done by the old way of fining. The iron being properly fined it is run into the third chamber, where it is quickly and effectively puddled.

From this brief description it will be seen that the iron is melted on a hearth by means of blast in contact with the fuel, and that this method consumes all that is combustible in the coal, and fluxes all that is sliceous, and causes it to flow out after the iron. It will also be seen that the puddling and melting processes are carried on together, and that the waste heat escaping from the melting of one charge is used in puddling another. It would be easy, where it necessary to do so, to prove that 12 cwt. of coal is ample to produce a ton of puddled bars. To operate on crude pig in a bath of cinder necessitates the use of fettling, but to fine iron, previous to puddling, dispenses with it, because the fining facilitates the puddling, by reducing the fluidity, and neutralising the corroding properties of the iron.

I shall not make any invidious remarks about a rival patent, but

dispenses with it, because the fining facilitates the puddling, by reducing the fluidity, and neutralising the corroding properties of the iron.

I shall not make any invidious remarks about a rival patent, but I repeat that fettling is a very expensive item in puddling, and yields no compensation for the expenditure. In the above estimate, after allowing it to compensate to the extent of I cwt. I qr. of pigiron to the ton of bars, it is 6s. 2d. per ton; but what will it be when it turns out, as ultimately it will do, that it yields no iron? There are places where nothing but fine metal is used, and that furnaces working plate-iron require no fettling. These are facts which, I think, no one will dispute; therefore. I need not adduce evidence to prove them. I may remark that if the system I have partially described will not require fettling, then it must tend to cheapen the mode of purifying crude iron. If the two estimates be compared, it will be seen that there is a difference of 3 cwt. of pigiron per ton of puddled bars between them, and that the balance is in favour of the American furnace. This is said to be due to the large amount of iron reduced from the fettling, but if we look a little under the surface we shall find that it is not iron, but cinder. I believe the truth has been candidly stated for the first time; it was stated "that 15 tons 4 cwt. of pigiron yielded 14 tons 10 cwt. of puddled bars," which means a loss of nearly 1 cwt. per ton, and this takes place when "\(\frac{1}{2}\) ton of purple ore, hammer scale, and such like, is charged every heat." The iron produced by the two furnaces may be fairly represented thus—the ball from Danks's as a saturated sponge, and from my plate-iron as lead.

Now, those who know the difference which the density of bars make in producing finished iron will understand that it will take much more of the former than the latter to the ton. Then, if the comparison be made in this way, how much pigiron will it take to produce a ton of finished iron, instead of a ton of

to get out of order, and is so balanced that it will exert no more friction on the bottom than is required to clear it. It will not require changing, as one tool will get the heat ready to ball. I have seen one hand-rabble get the iron into a state of fermentation, much more will the machine tool do it, as it will do more work than nine men with a rabble each. The furnace is capable of producing from 50 to 60 tons of bars per week, and of such a quality as cannot be surpassed. The weight of charge is what will produce ½ ton of puddled bars; more might be worked, but this is the safe limit both for yield and quality. I have stated the price per ton at 9s. Ironfounders say they can melt 2 tons of pig-iron per hour; if they can do this, as I melt nearly on the same principle, it is not extravagant in me when I say I can melt and puddle ciple, it is not extravagant in me when I say I can melt and puddle 11 charges in 11 hours, equal to 5 tons 10 cwt. bars. The labour can be distributed in this way, two forehands, two underhands, and a labourer to each furnace, though I cannot see what there will be for them to do. The labourer will attend to the charging and melting, and the puddlers will attend to the fining and puddling, and ball and draw the iron in the usual way. From this it will be seen that the puddlers will not have to fire, charge, fettle, nor clear the grate; they will simply attend the fining, and direct the operations in in-troducing and withdrawing the tool, and the puddling thereby, till the iron is ready to turn out for balling. Suppose only 10 charges per shift to be worked, or 5 tons of iron made, this at 9s. would be 21.5s. The labourer would have a good berth at 6s. per shift, so that

the others would have good wages and less work.

This furnace is adapted to work with any kind of fuel from anthracite coal to peat, and produce a superior quality, especially steel. Practical men who have seen and worked the furnace have raised no objection to it, but are confident of its utility and success. I have not invidiously assailed the so-called American furnace, which I have watched, and been well acquainted with the last 10 years, neither om acting upon the iron, and as the plenum and temperalame is regulated by the blast, the peculiar construction
is of no consequence. There is a slot on the stoper hole

ceive my readers. I would not have referred to the Danks Patent had it not been so persistently opposed to mine in a secret way. In conclusion, I beg to call the attention of iron manufacturers to a fact that has hitherto been disregarded. Before "pig-boiling" was discovered fined iron only was puddled, and at that time there was two ways of working it, which for distinction I will call the Staffordshire and Yorkshire systems. The former was known as the "drying system." The iron it produced by skilful workmanship was of a fine fibrous quality, but it was inadequate to produce a hard quality, or natural steel, and being imperfect, and degenerating through various causes, it was superseded by puddling crule pig.

This last system has had its day, and must give place to a better, more remunerative, and scientific method. The Yorkshire way of puddling fine metal is intermediate between drying and boiling

This last system has had its day, and must give place to a better, more remunerative, and scientific method. The Yorkshire way of puddling fine metal is intermediate between drying and boiling iron, and used to be known in the South as the "fomenting way;" it continues as it ever has done to produce a superior quality, while other systems are still subject to change. The opinion was that the excellent quality of the Yorkshire iron was due to the natural advantages they possessed in having superior coal and iron ore, but this opinion is not correct, and is not so general as it used to be. The fact I wish to call attention to is this, that however adapted to produce a superior iron the raw material may be, it is not due solely to this cause, but to an advanced and peculiar method of puddling, and that the iron made in other counties will yield equally as good results if treated in the same way. There is another thing that has not received the attention which its importance requires—viz., that there is a large quantity of pig-iron produced capable of yielding a superior malleable iron with proper treatment, but is contaminated with ingredients which cannot be eliminated by the ordinary way of puddling; I refer to those kinds of iron that are either "red-short" or "cold-short." Fining the iron prior to puddling it has proved ineffectual to expel them, yet there are substances to which they will and have yielded, but cannot be conveniently and economically applied in the present way of puddling. The Heaton and Henderson processes have proved this. My furnace combines in it not only the identical method of puddling fine metal in Yorkshire, but is an improvement on it in the cost of production, while it possesses facilities for the introduction of chemicals into the fining part, which no other furnace has.

Workington, May 19.

### THARSIS SULPHUR AND COPPER COMPANY.

With only a very few years existence this company has come to be one of the most prosperous mining concerns in the world, and some account of its history and present position cannot fail to be acceptable to our readers. The mines of the company, which are acceptable to our readers. The mines of the company, which are situated at Tharsis and Calanas, in Spain, are the property of a French company, who wrought them with more or less success for a period of twelve years prior to 1866. When the French company began operations they discovered many evidences to show that these now celebrated mines had been extensively worked by the ancients, and more recently by the Romans, and they are on that account no less interesting to the archaeologist than to the metallurgist. The evidences of their very early occupation are accumulating in the hands of the present company. They consist of immense slag or refuse heaps on the surface in the immediate vicinity of the mines, together with underground workings that have been prosecuted by ancient enterprise to a very considerable extent. Interesting traces of the extent of the former workings, and of a population which must have existed at these mines long ago, are constantly being discovered, in the shape of Romancoins, stone coffins, tear-bottles, Roman water-wheels, and other relics of a bygone civilisation. But, although in their day the early occupants of the mines, no doubt, extracted from them a great deal of wealth, they certainly did not impoverish them. The enormous quantities of mineral still proved to exist in the mines will very probably enable the Tharsis Company to pay handsome dividends to its shareholders for generations to come.

The Tharsis Sulphur and Copper Company (Limited) was formed about seven years ago, and in 1866 entered into an arrangement with the French proprietors, whereby they obtained a lease of the mines for the long period of 88 years. Of that period 81 years have yet to

about seven years ago, and in 100 entered into an arrangement with the French proprietors, whereby they obtained a lease of the mines for the long period of 88 years. Cf that period 81 years have yet to run, and will afford ample time for the partners and their successors to get rich by their investment. Of course, the latter result could only be attained by good management and enterprise befitting the circumstances of the case, but the Tharsis Company is fortunate enough to possess both these conditions in assuring abundance.

The following strictics: if user trives of the progress and extent of

The following statistics, illustrative of the progress and extent of the company's operations, derived from their reports, will be in-teresting to our readers. The quantity of mineral extracted at Tharsis in 1869 was 187,039 tons, and at Calanas 30,758 tons, together Tharsis in 1509 was 157,053 tons, and at Calamas 50,755 tons, together 217,797 tons; in 1870 it reached a total of 309,866, tons, an increase on the year of 92,067 tons. In 1872 the quantity raised at Tharsis was 333,460 tons, and at Calamas 41,055 tons; together giving a grand total of 374,515 tons, or an increase of no fewer than 156,718 tons over the output of 1869.

The productive capabilities of the mines have not as yet been anything like fully tested. At the Tharsis Mines the sole source of the minest surpresset the minest surpresset in the more of the minest surpresset.

anything like tally tested. At the marsis sings the sole source of the mineral supply has hitherto been the north lode and open-cast, which have been very productive, and will be still more so. During last year 153,430 metres of overburden were removed from this portion of the mine, at a cost of 13,310*L*, uncovering either wholly or in part to Dec. 31 last about 9,428,581 tons of mineral, calculated only, however, to the depth at which the mine is drained, and can at present be worked without inconvenience. Boring operations were commenced on the Central lode in August last, and a number of shafts were sunk on the ore, and the borings proved that the mineral existed at an average depth of 16 metres. A great deal of work has also been done at the south lode, with a view of preparing it for the operations of the miner; and it is expected that in the course of a few weeks it will be ready for a commencement. A drainage gallery, about 576 metres in length, has been constructed at the last-named lode; and both Central and South lodes are expected shortly to be in a position to give a yield of mineral that will very much enhance the present extraction from the mine.

means, of transit between Calanas and Tharsis presents, however, an means, of transit between Calanas and Tharsis presents, however, an obstacle to the rapid and extensive development of the resources of the former. The mineral at Calanas, therefore, has to be calcined, and carried in the form of precipitate to Tharsis on the backs of mules. From Tharsis to the shipping port of Huelva, a distance of 30 miles, the means of communication have been greatly improved by the present company, who have constructed a railway and provided a competent supply of rolling stock for the purpose. The mineral is carried down to the coast by this railway, which also brings a return to the company by carrying traffic belonging to other parties. A new pier has been erected at Huelva in order to facilitate the shipment, and although the works have necessitated a great deal of outlay they will ultimately effect a large saving in the worktate the shipment, and although the works have necessitated a great deal of outlay they will ultimately effect a large saving in the working expenses. In proof of this, it may be noticed that up to 1870 the shipments were effected by means of barges, at a cost of 2s, per ton, whereas last year they were made from the pier at only 11d, and this expense will soon be further reduced by the erection of additional crane-power. The number of vessels employed in the transit of the mineral in 1871 was 100—70 steam and 30 sailing; but last year the number had increased to 319, of which 211 were steamers and 108 sailing vessels.

During the last two or three years an almost incredible amount of money has been spent by the company in the improvement of the

During the last two or three years an almost incredible amount or money has been spent by the company in the improvement of the mines and their appurtenances. Not to go further back than the last 12 months, we find that in that time they have, after heavy writings-off, added to their capital in works, buildings, machinery, and plant in Spain to the extent of 21,504l. Three stationary and one small engine have been added to the works of the mines, four new groups of houses, providing 52 good dwellings, have been built for the workmen, a girl's school, to be used also as a Protestant chandle has been mental new roads and railways have been made.

for the workmen, a girls's school, to be used also as a Protestant chapel, has been erected, new roads and railways have been made, and fresh explorations of the mines have been carried out. All this has been charged to the account of the year, and extensive and costly improvements have, besides, been made on the metal works belonging to the company in this country. Of the last-mentioned works two are at Glasgow, two on the Tyne, one at Widnes, in Lancashire, one at Oldbury, near Birmingham, and large works are at present in course of erection at Cardiff.

To give an idea of the financial progress of this company it will not be necessary to go further back in its history than the year 1869, and it will be well to bear in mind that in that year, as compared with previous ones, there was a considerable depreciation in the market value of both sulphur and copper, which had exercised an unfavourable influence upon the operations of the company. The profits earned during the year 1869 amounted to 53,509/. 10s. 6d. Of this sum 36,994/. 18s. 7d. was devoted to dividend, giving 5 per cent. to the partners (free of income tax), and the remainder, less income tax and the remuneration of the directors and auditors, was carried forward to next account. In compliance with the desire of a large to the partners (free of income tax), and the remainder, less income tax and the remuneration of the directors and auditors, was carried forward to next account. In compliance with the desire of a large number of shareholders for half-yearly dividends, the directors declared and paid in November, 1870, a dividend of 5 per cent. additional to that paid in May on the earnings of 1869. The net profits of 1870 amounted to 94,5711, 178, 6d, an increase over those of the previous twelve months of no less than 41,0621, 7s. A second dividend of 5 per cent. on the earnings of the year 1870 was paid in May of the following year, after 27,2061, 158, 5d, had been set aside for next account. It would thus be seen that the dividend paid in 1870-71 was exactly double that of the preceding year. The system of paying half-yearly dividends, one of which was paid while the account for the year was running, although not productive of any serious or embarrassing results, was not considered altogether satisfactory by the directors and shareholders, and by a unanimous resolution passed at the annual meeting in 1872 the board of directors was empowered to make an alteration which saved a great deal of trouble, and offered a guarantee that the company should not by any means run short of funds. Instead of paying two distinct dividends in each year, it was resolved that no money should be paid away until it was declared to the partners at their annual meeting that it had actually been earned. This was to be done in April of each year, and the dividend paid in two equal instalments in May and November following. The profits for the year 1872, with the balance for the previous year, reached the very large sum of 377,9911, 128, 5d., showing an increase on the profits of 1869 to the extent of 324,4524, 1.11d. In other words, in the course of the past three years the profits have increased considerably more than fivefold. It should be stated the sum given as net profits was what remained after the expenses of the year and the writings off fo

It was with this magnificent and clearly earned income in their coffers that the directors were enabled a few weeks ago to announce the extraordinary dividend of 40 per cent, a dividend which must have been exceedingly gratifying to the partners, coming as it did, when mining ventures, like the Emma for instance, were in a position when mining ventures, like the Emma for instance, were in a position so unsatisfactory that the shareholders were up in armsagainst their management, and fearful lest ruin should be about to overtake them. The position of the Tharis Company is shown to be all the more sure and stable by the fact that it is confidently anticipated the dividend of next year will be little, if any, short of 50 per cent. A very great deal of the prosperity of the company is undoubtedly due to its excellent board of directors, which is presided over by Mr. Charles. Tennent, of the St. Rollox Chemical Works, Glasgow, a gentleman whose eminent business qualities are abundantly manifested in the management of the gigantic and lucrative private business in which he is engaged. The partners of the Tharsis Company have reason to congratulate themselves that at a time when, in some quarters, the standard of commercial morality was not exceedingly high, and when disclosures were being made which showed that numbers of speculators had been drawn into fictitious concerns by the display of "bogus" shares, they had found a safe and highly profitable investment; and they certainly might do worse than adopt the advice tendered by one of themselves (Mr. Jaser W. Johns, of London) at their last annual meeting. He said he should like to see all the present their last annual meeting. He said he should like to see all the present their ast annual meeting. The said he should like to see all the present holders of shares lock them up in their safes and leave them to their grandchildren, because it was quite clear, from what they had heard from the Chairman of the company in reference to the unburdening of their mineral, that they had a mine of something like 100 years duration at the very least, and that was a source from which he was sure they would all derive very great benefit.

### MINING IN COLORADO.

Str. - Notwithstanding the indifference, almost amounting to disfavour, into which Colorado mining speculation has fallen of late in England, I venture to bring the subject at this time before your readers. Compared with California, Nevada, Utah, and other western States and Territories, Colorado produces to-day the richest ores, both of gold and silver, which are sent to Swansea or Freiberg. I do not in this letter propose to enter into the reasons why the comns, most of them unwieldy and possessing high-operating in this and neighbouring counties, become, dividend-paying investhave ceased to be, or failed to become, dividend-paying invest-ments. My object is chiefly to draw the attention of your readers to what appears to me the most remunerative field for small in-vestments ever presented in any mining country, an avenue which will become closed in June, 1874, when the Amended United States Mining Act comes in force. In the interim between the present and that time locators and purchasers will be compelled to so im-prove their lodes (of which there are legion) sufficiently to entitle them to a United States patent, or they will become liable to for-

feiture and re-entry.

Under these circumstances many persons who from poverty are unable to perform the requisite \$500 worth of improvements thereon are offering an half-interest in their lodes as an inducement to capitalists to accomplish for them the necessary amount of work on the lodes to obtain their full title to the property. Many of these properties are, no doubt, of the most valuable character, within the ichest belts of lodes, and, in all probability, would become paying

I may here state that the Colorado Central, the Saco, and many other lodes of like celebrity at the present time, producing large quantities of very rich ore, could at a very recent date have been purchased on the above terms for a few hundred dollars, whilst these ame properties could not to-day be obtained for as many hundred thousands

It appears to me, as a miner of considerable practical experience both in England and the States, that this Territory exhibits in this direction both to the large and moderate capitalist an extraordinary opportunity for investment. For instance, by an expenditure of (say) 3000% one-half interest in from 20 to 30 lodes could be ob-(say) 3000% one-half interest in from 20 to 30 lodes could be obtained, a good percentage of which would, in all probability, prove to be valuable properties. Of course, it is presumed that in the selection of lodes upon which to operate the investor will be guided by persons of recognised probity and practical experience, who are thoroughly acquainted with the country.

I hope the present letter is sufficiently clear to enable your readers to comprehend my meaning, and the opportunity afforded them; but I shall be glad at any future time to furnish you with any additional information on this or like subjects.

ditional information on this or like subjects.

DANIEL ROBERTS, Mining Engineer.

Georgetown, Clear Creek County, Colorado Territory, U.S. of America, April 9.

### A FISSURE VEIN.

A FISSURE VEIN.

SIR,—The reason why some persons fail in mining while others succeed is very plain: the former observe the established principles of Science, while the latter ignore them. Nothing is more usual in these latter days than for persons to purchase a claim, and call it a "mine." Perhaps it may be simply a float deposit of silver-bearing ore in the Eureka district, or the White Pine district, in Nevada, or argentiferous galena in Utah; it may have been rich for 100 or 200 ft. in depth from the surface, and become suddenly worthless and exhausted. When this occurs it is explainable upon well-established scientific principles—the deposit was superficial, it was merely a mass of float rock carried there by the "diluvium" of former ages, and hence no one should have expected or promised permanency for it. If anyone desires to invest in a mine which will be permanent, and improve in wealth as he descends upon the vein, let him invest in a "true fissure vein." Prof. Whitney in his "Metallic Wealth of the United States," says:—"True fissure veins are continuous in depth, and their metalliferous contents have not been found to be exhausted, or to have sensibly and permanently decreased, at any depth which has yet been obtained by mining," In further illustration of this subject the following is especially instructive, and as it is contained in the United States Official Report on the Mineral Resources of the States and Territories West of the Rocky Mountains, transmitted to Congress March 5, 1868, it is entitled to the highest confidence:—"The mother gold lode of the State of California is in many respects the most remarkable metalliferous fissure vein in the world; the gold is generally in fine particles, and is distributed evenly through a large portion of the lode in the pay chimneys, and there is very little of the rock entirely without gold. The width varies from 1 ft. to 30 ft.—that is, the main vein as worked; but it is accompanied by branches or companion veins, so that the total width of vein matter

of vein matter is sometimes nearly 100 feet. We do not find in our books mention of any similar auriferous deposit in other countries." As an evidence of the two characteristics of a fissure vein—in-exhaustibility in depth and increasing richness in descent—take the Hayward Amador Mine of California, situated upon the mother lode. This remarkable mine has paid over 2,000,000\(\text{to terling to its owners has been worked with increasing richness to its present depth of over 2000 feet, the rock gradually rising in value from 2\(\text{to 51}\), per ton, and now, at its depth of 2000 feet, it is worth \(\text{61}\) sterling per ton, and is worked for 1\(\text{l}\). The same geological features are shown by the other gold mines on the mother lode, in Amador county, California, but my object is to establish one single proposition—viz., fissure veins are permanent, float deposits are temporary, and the above is sufficient for this purpose.

Anglo-American.

### AMERICAN MINES, AND FINANCIAL AGENTS.

AMERICAN MINES, AND FINANCIAL AGENTS.

Str.,—I beg to enclose a slip cut from the Salt Lake Eulowment relative to the Emma Mine, and which also shows to some extent the reason why American mines have up to the present time been unsuccessful here. Although we (inhabitants of the Western Pacific Coast) are spoken of here in terms anything but complimentary, on account of the miserable failures that most of our mines have turned out, the ills that English stockholders have to bear are of their own making—or, I should say, are made by their "promoters." I can fully confirm everything that the writer of the enclosed says respecting the way mines are "stocked" here. Last year I myself offered on this market a property in Nevada for the sum of 60,000. The brokers, through whom I was negociating, told me that I must allow them to add 10,000% to this amount for their commission and allow them to add 10,000% to this amount for their commission and legal expenses; to this I agreed, and the "sale" progressed so far that we met at the "proposed purchaser's" office to sign contracts, &c.: but during the interview it accidentally transpired that the small sum of £75,000 had been added by the brokers, without the knowledge or consent of either myself or my co-partners. Of course the sale fell through. Many of the properties that have been sold small sum of £75,000 had been added by the brokers, where a like however consent of either myself or my co-partners. Of course the sale fell through. Many of the properties that have been sold here and brought out in companies are undoubtedly good, but have been really damned by the exorbitant "squeezes" of promoters, brokers, &c. The Emma Mine is an undoubtedly good property, but I can quite understand that it is an "awful strain" on the mountain to keep up paying the dividends on such an amount as \$5,000,000; but with proper and economical management, I think the Emma can pay a good dividend even on that amount for some the Emma can pay a good dividend even on that amount for some time to come.

But apart from this, it is a strange truth that English capitalists have seemingly preferred doubtful mining risks in America to sound properties. They have persistently refused to buy anything that can bear an honest investigation, and the "experts" that have been sent out generally prefer fishing, shooting, and sport in general to the more arrived that the second to the contract of the second to the s more arduous duties of properly examining a property. Many good mines, properly developed, and with collateral security for at least a part of the purchase money, in the shape of mills, transways, and substantial machinery are to be had, if we could only come in direct substantial machinery are to be had, if we could only come in direct communication with the capitalists; and not be bothered by brokers, promoters, "financial agents," et multis alies, all of whom expect to be paid. Another thing is also necessary, before concluding any purchase—the purchasers should send out from here a trustworthy and competent mining engineer, one who will, notwithstanding the very probable temptation of filthy lucre—make a faithful and proper examination and report on the property in question. When this is done the confidence in American mines (which ought never to have been forfeited) will again obtain in the minds of English investors. I do not say that all the mines which have been brought to this country have been of the highest class—in fact, I fear that to this country have been of the highest class—in fact, I fear that many have been of the "wild cat" tribe; but they are only very small drops in the very large ocean of valuable properties in our Western States; and for all evils there is generally a remedy, and I have endeavoured to point out the remedy for this one. FACT.

London, May 21 "The EMMA MINE, AND LONDON STOCKHOLDERS.—The London Mining Journal of March 29, as we learn by the Tribune, contained the following.—'Emma shares have declined to 884, 9. Dissatisfaction continues to be expressed at the reticence of the directors in face of all sorts of disconcerting rumours: it is generally believed on the Stock Exch inge that the first report from the nevely-appointed immager (Mr. 6. Attwood) has been received, and that it is of a decidedly unsatisfactory character; it is also rumoured that there has been another accident at the mine.' To begin, no report from Mr. Attwood had reached London at that date. He had reached Salt Luke only on the 18th, and had not time to get a report to the directors by the time of the Journal's publication. In the second place, all the libta English stockholders bear are the natural consequence of English cupidity—as fully set forth in our San Francisco letter several weeks ago. For instance, an agent for American mineowners goes to London to find a market. He very soon discovers that he can do nothing except through the intermediation of English promoters. Since our letter, above mentioned, the points set forth in it have been descanted upon by other journals. The English promoter asks. 'Whatdo you ask for your mine?' 'Two hundred and fifty thousand dollars,' says the American holding his breath. 'Fie! we can't do anything with a troperty that can't be stocked for a million. 'Very well,' said Agent, gaining courage, 'it is worth a million if you can get it.' 'Well, out it at two millions and a half, and take hold.' 'And how much of that goes to the owners?' 'Two hundred and fifty thousand coin, two hundred and fifty in oritinary shares.'

And it goes: and that is how these complaints from British stockholders are imposed upon. If the Emma had gone into the hands of the stockholders at the price, or double the price, received by the locators of the mine, THE EMMA I

it would to day be regarded as one of the best investment into. It was stocked at 5,000,000, and it is gold

### MINING IN COLORADO—PHILIP'S MINE, BUCKSKIN PARK COUNTY.

PARK COUNTY.

Str.,—In consequence of the severe weather—continual snow and—since my arrival here, I have been prevented from a anything of the mines in the district other than the one above me which I am getting into working order as fast as possible, and ing from what I have yet seen, it is a valuable property, and haps, a few particulars of it will not be uninteresting to you merous readers. The lode was first discovered in the year 18 Joseph Megar, alias "Buckskin Joe," an Englishman, I believe Derbyshire, who, with his two partners, commenced operation the lode at the foot of the mountain, where the surface query rich, and the lode of great width, being from 30 to 40 feet and extending about 1000 ft. into the hill, and about 20 ft. in which gave a profit of \$394,000 to the three proprietors by we and extending about 1000 ft. into the hill, and about 20 ft. in which gave a profit of \$394,000 to the three proprietors by we the ore in sluices, yielding about \$240 per solid fathom by the cess, and would have yielded double that amount by stample some of the quartz is very hard, and was all thrown any which has been taken up and stamped by other parties, and immense profits, of which no returns have been kept. Belo surface ore, at the depth above mentioned, there is a solid given payities and a portion of conver ore 20 ft is a solid. surface ore, at the depth above minded a line is a solid iron pyrites, and a portion of copper ore 20 ft. wide, that under stamps about \$80 per cord, and will make at the works from \$10 to \$15 per ton, and will leave large profit

ander stamps about \$80 per cord, and will make at the smelting works from \$10 to \$15 per ton, and will leave large profits at the works from \$10 to \$15 per ton, and will leave large profits at the price, and from present indications, as we sink through this or think we shall get to a productive lode for copper and gold as shall have one of the best mining properties in Colorado.

There are other mines near here, and the Mounthelon Mines, and shall have one of the best mining properties in Colorado. There are other mines near here, and the Mounthelon Mines, and the mitted the mitter with one furnac, at what their prospects are for the future. We have one smelty works that has been running all the winter with one furnac, at now they have commenced to put up another; and the Botage furnaces this week for a capacity of 20 or 30 tons per day, and the ore that can at present be raised of a high price, and unless a lodes are discovered, I fear there will not be a sufficient quantum supply them, unless they purchase ore of a low price, or gas from the other side of the range, which will be expensive in came when I left Central City the machinery was started in the Botage tunnel for draining the water below that level, which I should have mentioned before this if I had any confidence in its answeings purpose, But as the machinery was the invention of the mange, who is very presumptuous in his own views, I have waited it result, and I am sorry to say that my predictions have been reflect as I have been informed that the whole thing has broken to place as I have been informed that the whole thing has broken to place as I have been informed that the whole thing has broken to place as I have been informed that the whole thing has broken to place as I have been informed that the whole thing has broken to place as I have been informed the mine to any depth, and now I fear is mis will be again abandoned, which will be much against the Central City, as mining in that district is going down as fast as it near I teannot be wonder

### ACCIDENTS IN COLLIERIES—THE HERMON PRIZES

ACCIDENTS IN COLLIERIES—THE HERMON PRIZES.

SIR.—In the Mining Journal of Saturday last there is a letting the above subject, signed "A Resident Colliery Manager," and say whole tenor, with its illogical conclusions, is calculated to be the character of the body to which I belong, perhaps you will dan me to say a few words with respect to it.

I may say that, in common with many other mining engined looked forward to the essays of the working colliers for the pass offered by Mr. Hermon with a great deal of interest, working whether anything really new would be found in them. I was beever, greatly surprised to find that a colliery manager, and ! yo sume a gentleman, should have so far forgot himself and the pounds, to wrench from the working miners one of the two pass offered to them alone. Not only so, but that he should exulting proclaim such sordid and selfish reasons for doing so, for heap in the hopes that I might gain the first or second prize. He further states that as Messrs. Dixon and Casey (who have never attand any higher position in a colliery than that of ordinary working miners) were considered eligible, "how much more should a mining engineer be eligible?" The reasoning is simply absurd. The pust were offered to working colliers, and it would be ridiculous into extreme to ask them to compete with mining engineers with read to a subject which has puzzled the ablest men in the profession surely it is not to be had by putting himself in competition with a working collier,—a levelling down which may be safe with that the "Colliery Manager" will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager will withdraw at once from the or the colliery Manager. is one which can bring neither credit or honour. I hope, therefore that the "Colliery Manager" will withdraw at once from the conpetition, and see that he has made a very great mistake in what is the control of the c

vouring to wrest one of the prizes from a working miner.

In conclusion, Sir, I say the only reason I have had for note
the matter is lest it should be thought that the mining engine
whether as a body or individually, would endorse any depart
from the path of honour which is one of the great characterist
of the preferrier. A MINING ENGINEER

### N. ENNOR'S REMARKS AND ADVICE TO YOUNG ASPIRANS ON LEARNING NATURAL LAWS, AND WHO SHOULD E THE MINE AGENTS-No. IX.

THE MINE AGENTS—No. IX.

SIR,—I trust you will excuse my sending you this so late all have been busy getting on with my stamps, and have not had the to carry these letters out as I intended. I notice, however, the some pretending learned ones scoff at Nature's laws. I am sussuch men exist: useless weeds creep into most fields when not well managed. This gives me an opening to ask such narrow-minds creatures—I cannot suppose them men—they are to me only moning creatures, with no intellectual mind, and only such as should dotted radgery portion of all work. Their own remarks show they amen not in any way calculated to develope the hidden treasures long locked up in the great store of the earth. All right-minds men are getting to see the great deficiency in even too many England's practical captains. How many of them do we see we have worked mines all their lives and never land a paying one. He they in early days studied Nature's laws, and followed them, they would have found paying mines ere this. These men, for want they in early days studied Nature's laws, and followed their would have found paying mines ere this. These men, for we knowing the freaks and laws of the earth, often stick to on all their lives, and particularly if they happen to have a and a field or two near, when they ought to know the mine! a single chance of becoming a paying one, and never should been worked over five years. Were I about to bring out and to select an agent, my first question to him would be how paying mines he had formed—one, two, or three, as may be answered none, I should ask what mine he had been in, we most likely would say that it did not meet expectations. most likely would say that it did not meet expectation I should know the mine, and would give him all the lenity I if I saw room: but he had worked the mine far too long, and likely had not then proved what he should have done in five whet he had been been sometimes. What side lodes had he found, and what other cross lodes and it of nature he had discovered that had of nature he had discovered, that had caused him to sper sum on it. His answer would most likely condemn him. then tell him to call again.

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My advice to all those speculating in mines is to select suffying agents, or older ones that have found two or three divides

paying mines. The old 20, 30, and 40 years agents, that never had paying mine, are not the right men in the right place. They may a paying mine, are not the right men in the right place. They may a paying mine, are not the right men in the right place. They may a paying mine, are not the right men in the right place. They may be and cling to their salary. I am quite aware that some inparts, and cling to their salary. I am quite aware that some inparts are found to have made lucky hits, but I never saw one of the best of Nature's these so found paying mines but one or more of the best of Nature's asy that feals were found to have taken place in it. They often say that feals were found to have taken place in it. They often say that feals seaming ones, but I have found many of them who could give him assuming ones, but I have found many of them who could give him faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the formation of ore; and they too often but faint outlines as to the faint on ore in faint outlines as a to the faint on ore in faint outlines as to the faint on one in faint outlines as to the faint on ore in faint outlines as to the faint on or and they too often the faint on ore in faint outlines as the faint of the faint on or and they too of the best o

faty pay in Devon, and have a support of the second valued Cardigan district.

It is the working of mines that never showed a single chance of the self-supporting that does the damage. This is the great inwheck in mining. My advice to genuine mine adventurers is inwheck in mining. My advice to genuine mine adventurers is in beware how they get into mines that show little or no chance of stemming the outlay. Take care you have a captain who studies is work. If so, he will show you every good point that can prove is wit in the sett, showing what they are, and the reason why he se confidence in their proving so remunerative. Beware of what may be termed "fop captains." They think but little, and write that best suits their purpose.

I was recently on Tregoss Moor, when I had occasion to go to an not feed my horse, where I noticed a stir among the people, they said the buke of Argyle was coming to see Roche Rock. I ran at and saw a splendid looking open four-wheel carriage, with two

said sawa splendid looking open four-wheel carriage, with two and sawa splendid looking open four-wheel carriage, with two fare persons in it. I could not see the face of the one I supposed a the Duke, but I noticed he had on the largest white felt hat I erer seen. I thought this very fair for a Scotchman in his poto take care of his beauty, when a stander-by called out was not the Du'se of Argyle, but only a "fop captain" of two elittle bals, who often went his rounds about midday. This three little bals, who often went his rounds about minday. This her took me aback. I asked my informant if either of his mines paid a dividend. The answer was that they had not, nor never ald. This did not surprise me, as I should have thought him far are in his place had I seen him on the mine, with his underground ket on, and a candle in his hand. I called at two other mines are memorially two days following, and there found the right and in their own place. They had to be fetched up. This was er took me aback. en in their own place. In their or agents on duty. The former may have been in-ted to show off, as half the mines brought out of late are not gold to be worked with a view to actual profit from genuine ere: it is to collect money to be scrambled for -nct by

etuns of ore: It is to contect money to be scrambled for—net by the workmen as wages for opening the mine. These men at times are presented with a piece of plate, but most times it is money, when they have settled down, and the scramble is over.

Ilet this suffice for the present, as I intend to ask our schoolaught miner to give us a little information on electricity, and its ction and effect on the earth, its lodes and veins.

Leff it takes any, what part does it take in the formation of

boles and venus?

II.—Does it aid them in collecting and forming ore?

III.—If it, or has it, anything to do with the shifts of lodes and coal beds? If so, did the shift take place when they were

electricity present when the globe was first formed, at purpose? Did it act as the earth's axle, and took its of the state of th

VI.-Did electricity give life to all creation, and worked under

natural law since?

chools have broached so many theories on the world's forion, that I think it is only right that those paid for instructing miner should give an open and can lid answer to their theory, he one which they suppose most feasible to adopt.

N. ENNOR.

### TIN DRESSING-"PLUMBUM ALBUM" AND CAPTAIN THOMAS PARKYN.

-I do not see what object "Plumbum Album" can have Sig.—1 do not see what object "Plumbum Album" can have in slighting facts; it serves to show, however, the difficulties with hich a writer is beset when he is compelled to have recourse to the measures. To deliberately misconstrue an opponent in conversy is proof presumptive of two things—first, meanness of dissistion in the individual himself, and, secondly, his inability to all successfully with the matter in dispute. But when, in adding to misconstruction, misquotation is practised, I have no hesition in saying that the acme of dishonourable conduct has been alled. To change the construction of a sentence by the observation tion to misconstruction, misquotation is practised, I have no hesitation in saying that the acme of dishonourable conduct has been scaled. To change the construction of a sentence by the abstraction of words and the substitution of others is an act that can scarcely be surpassed. But if by such wrong-doing he had succeeded in making out a case we should, in spite of its moral turpitude, have been compelled to admit the ingenuity of the performance; but, as it is, it is nothing but a jumble of inconsistencies, inaccuracies, misrepresentations, senseless assumptions, and shallow conceits. If proof of this were needed the following would suffice. I am represented by this unscrupulous writer as having wantonly and maliciously assailed, and attempted to cast odium upon, the name and the efforts of a deserving man. Now, it must have been well known to him at the time he penned this that I did no such thing. He knows as well as I know that Capt. Parkyn's letters and diagram had been been previously published, and that no adverse comment had been visited upon them. It was not until the whole community of tin miners in Cornwall were slurred by this injudicious patron of Captain Parkyn that any notice was taken of the matter, and, writing as I did to refute the errors which were being propagated, it was scarcely to be expected that the name of Capt. Parkyn should have been altogether omitted from my communication; and, as I could not endorse what his enthusiastic admirer had said of him, there was no alternative, if I said anything at all, but that I must dissent from him, and therefore my unavoidable allusion to him need not to have been met by so indiscreet a reply. If was quite competent for him to have been silent in the matter without sustaining any diminution of personal honour, or, at the umost, to have quietly replied that his plans had been submitted the public, and that he was quite content to abide the issue on the merits. But, instead of that, he rashly introduced another subject more vulnerable than the firs comers in regard to mining. It is easy to be a braggart, but what then? It may sometimes provoke a retort more caustic than clement. I remember two mine agents of good standing who were colleagues, but sometimes differed in their views of mining. On one occasion, while they were debating a point about which they differed, the one which happened to have had the worst of the argument bristled up and warmly interpolated, "I am as good a man as you." "Ah!" the other quickly replied, duly estimating the advantage he had gained by that indiscretion, "it is not so much what we think of ourselves as what others may think of us."

I do not regret the part I am taking in this disscussion, as I am fully convinced that it is high time that someone should oppose the fallacies which are now in vogue. It is easy to make statements, but not so easy to verify them, especially when they proceed from impulse. We have heard a great deal of late about profits being made from mines producing very low-quality tinstone, and it is surplished that the surp

mpulse. We have heard a great deal of late about profits being made from mines producing very low-quality tinstone, and it is surprising that some of the affirmations made in this respect should find sconders and obtain credence. I need scarcely say that I do not believe in the soundness of such estimates; but if I am wrong I am open to correction. Capt Parkyn has stated, and challenged me to refute that statement if I could, that he mined and reduced ores which contained only 4 to 5 lbs. of tin to the ton of stuff, and at a monthly profit of 100L, and being apprehensive, probably, that that statement might be misunderstood he volunteered to furnish to the

Mining Journal particulars of the detail which led to such results.

Mining Journal particulars of the detail which led to such results. I confess my utter disappointment at not finding that promise redeemed, but instead a few general remarks relating to the opening of the mine, the extent to which it had been opened, and the rapid increase of the quality of the lode stuff in depth.

I expected that the promised particulars would have related to the number of men employed underground, the number of tons brought to the surface, its average value as per sample in bulk, the number of tons stamped daily on an average, and the resultant quantity of black tin monthly, and the prices at which it was sold. The number of persons employed at the surface, and whether steam or water power was employed on the mine; but, instead of details like these, which might have been instructive to mine agents generally, and have proved the correctness of the original statement. That which is given goes far to invalidate it; as, for instance, instead of the aggregate yield of the mine being produced from stuff yielding only 4 or 5 lbs. of tin to the ton, and I would like to know what sagacious miner would mine in 5-lbs. stuff if 25 lbs, to the ton was available? So far as Captain Parkyn's letter, in the Supplement to last week's Journal, goes it disproves entirely his former statement, as therein it is shown that the minimum produce was about 5 lbs., and the maximum 25 lbs. of tin to the ton, and if equal quantities of each were worked 15 lbs, instead of 5 lbs, would have been the average—a difference of 200 per cent, higher than that first stated, and one would like to be informed how loose statements of that kind can be beneficial to mining adventurers. I have for a long time felt that it was a serious error, whether intentional or inadvertant, the setting forth and recommending tin mines as sound investments which would only produce 8 or 10 lbs, of tin to the ton of stuff. I would not give 5s, per dozen for such mines. I mean, of course, where shafts have to be sunk, and engines, &c., erected; and wh thing more tangible than bluster to obtain my endorsement

MINE AGENT.

### PARKYN'S "SAVE-ALL" TIN DRESSING FLOORS.

PARKYN'S "SAVE-ALL" TIN DRESSING FLOORS.

SIR.—In the Supplement to last week's Journal, the letter signed "Mine Agent" is really so unpractical, untruthful, and out of place that no one who reads it will think for a moment that the writer was sane. Fancy a man standing 40 years' storms in tea-pots. Who on earth would believe him to be a mine agent; and I ask what kind of brains can he have? and as to his untruthfulness. I will prove it by his own letter. "Mine Agent" says that he dislikes the importation of personalities into a discussion of this kind, and never resorts to them except in retaliation. Now, what did he do the very first thing? Wrote a letter to be published in a public newspaper, justly stating that that paper was read throughout the world, and mentioning my name in full, while at the same time he knows me personally, and might have communicated with me by letter. Then I say his letter is an untruthful one, and nothing to the point in tin dressing; he has not pointed out a single thing that is wrong in my "Save-All," and as to the size of grates they were never mentioned, for a good reason known to himself. Then he says that I could not have passed all the tinstuff through the tin-floors I mentioned the for a good reason known to immediate the new says that I could not have passed all the tinstuff through the tin-floors I mentioned the week before. What I said is truth, and the books can be seen; he forgets that my plan saves 40 per cent. in labour cost, on the whole, and that my life-rack will dispatch as much as six racks that are in use in some mines that are well known to the writer. Moreover, he is calculating the cost of dressing like some mines now in his immediate neighbourhood where they land up the tyes in a wheel. immediate neighbourhood, where they land up the tyes in a wheel-barrow, and then wheel the tinstuff a considerable distance, tip it out, then it has to be shovelled into a thing, and washed in a round buddle. This I saw myself not a month ago, and "Mine Agent" will advecte this mode of dessing. While these hearting the same of will advocate this mode of dressing. Would not these be antiquated modes of dressing

I am quite aware that the different kinds of tin should be treated properly, and the rough or round tin separated from the slime, or rack or frame tin, and this I said in my first letter, when I fully ex-plained it, but "Mine Agent," in my opinion, has a shallow memory. I am bound to tell him that I really believe that some Chinese know lam bound to tell him that I really believe that some Chinese know far more about tin dressing than he does. I do not want any building up or puffing, it is what I dislike. And I say again that I am quite prepared to meet "Mine Agent" on any subject on mining, either above or below ground, and let us compare brains. But one thing I must ask him, he must keep his tea-pot at home, for I confess I never had the experience he claims—storms in tea-pots. I mentioned a mine where 7000% worth of tin was found under the boards and about the mine, and not, as "Mine Agent" says, under the boards. He is very slippery. I no not take Mr. Ennor as an authority, perhaps we might not agree in our opinion. I mentioned Mr. Ennor's name as he made the statement, and it was not contradicted. I say also that "Mine Agent" has not got a hopper in use like mine, unless he has adopted them since my plan was made public. The public will not forget that every improvement in any branch of business has first its enemies, and as I have proved my plan for nearly ten years and find it answer so well, I am willing for others to have the benefit of it. Another most important feature is that the quantity of ground required for laying out the floors is that the quantity of ground required for laying out the floors would be considerably less than in mines generally. And in this a great saving will be effected. I am quite willing for "Mine Agent" to go on in his old way, as men of his stamp do not like to be moved.

May 22.

Thos. Parkyn.

### THE ASSAYING OF ORES.

THE ASSAYING OF ORES.

Sir,—I have been favoured with an opportunity of making a series of experiments, the results of which will greatly interest a large number of your readers; I, therefore, venture to furnish you with details. Hitherto, in consequence of imperfection of appliances, gold-seekers, capitalists, and investors have met with great discouragement, not because the noble metal did not exist, but that the methods of determining its existence and of procuring it were defective. Of this fact I have always been convinced; now, more than ever, from practical experience. Mr. W. T. Rickard, the distinguished assayer, recently returned from the United States, has completed what has so long been the object of research, and in his improved (patented) amalgamator and condenser the vexed question appears to be solved. Incredulous, amongst thousands of others, I required proof of the assumed merits of the machine. This has been afforded me. A model was produced, and its powers have been attested under my own superintendence. These far surpass the results I was led to expect. For example, the tailings from the Eberhardt Mine, duly treated, I found by careful assay to yield I3 ozs. I dwt. 8 grs. of silver; after exposure to the action of the machine they gave 4 ozs. I dwt. 16 grs., thus supplying no less than 8 ozs. 3 dwts. 16 grs., or 69 per cent. extracted from matter which has hitherto been, as I am credibly informed, regarded and treated as valueless. I am now engaged in a series of experiments upon gold as valueless. I am now engaged in a series of experiments upon gold thus far the results promise to be equally satisfactory.

Finsbury-place, May 22.

W. White. that thus far the re

### DRESSING OF ORES.

SIR, - For some time past I have observed in your Journal a length ened correspondence regarding the cheapest and best method for dressing and washing ores. Some of the inventors go in for tin, others for copper, lead, &c., but I have not observed any one refer others for copper, lead, &c., but I have not observed any one refer to the dressing of iron ore, which is now required in such vast quantities to supply our increasing trade in the article of iron. It is well known that iron ore should be delivered to the ironmaster in as pure a state as possible. Pig-iron cannot be made from silica, alumina, or any other gangue found in all ores. The metal in the ore only can be turned to profitable account, and hence the necessity of sending it to the ironworks in the highest state of purity. The cost of transit being a very serious item connected with the removal of the ore from the mine to the furnace, smallness of bulk containing a maximum percentage of metal should be the aim of the producer of the ore. ducer of the ore

I am led to bring this subject before your correspondents who

direct their attention to ore-diessing machinery in consequence of the frequent complaints of ironmasters that iron ore is often delivered to them in a very dirty state, without any previous washing done to it to take away the impurities contained when raised in the mine. In the County Antrim a very extensive district, containing vast quantities of superior hematite iron ore, has within the past three or four years been opened out. The matrix of the ore is principally alumina, with a small quantity of silica.

The ore is found generally in a soft decomposed condition, mixed with clay; it is called a psolitic ore, arising from the iron of the ore being in the form of a pebble, varying in size from small shot to that of a horse-bean; large quantities as raised crumble into dust, and the hardest parts could be easily crushed by ordinary crushingmills. I am disposed to think a very extensive field is found here

mills. I am disposed to think a very extensive field is found here for the ingenuity of many of our machinists who devote their attention to the best means of dressing ores economically by machinery; and as one taking an interest in the development of the resources of our home mines, I should be glad to see this subject discussed in the pages of the Journal. The high price of coal has considerably increased the cost of manufacturing iron, and consequently necessitates the ore being sent to the furnace containing the minimum of tates the ore being sent to the furnace containing the minimum of impurities.—Bedford, May 21. Silas Evans.

### MINES, HOME AND FOREIGN.

Str.,—Observing an enquiry from "Speculator," under the heading of Notices to Correspondents in last week's Journal, as to where the mines I have named as capable of paying cent. per cent. on the capital required for working them can be seen, I would name West Lisburne, situate about one mile west of Grogwinion, and two miles west of Frongoch. In the former of these properties they are openout a good and lasting dividend-paying mine; and in the latter, about the deepest mine in the county, the bottom level, 124 fms, under adit, is in one of the richest courses of ore ever seen at that extremely rich and profitable mine. Again, I would point to West Esgair-hir, as a property safe to return cent. per cent. on the working capital. This mine is situate two miles west of Esgair hir, where they are now opening out on courses of solid lead ore, varying from 2 to 3 ft. wide; and on Thursday last, in company with Capt. Pryor, of Mold, I saw at surface the very best pile of silverlead I ever saw raised in this county. The third, and last, I shall now name is the South Esgair-hir, and which was inspected by Capt. Pryor. To give an idea of his opinion of this mine, in reply to a question I put after our visit, as to what he thought of it, he said "I like it as well as any mine I have seen in the county." If "Speculator" will forward me his card and address, it will afford me great pleasure to go over these mines with him, and afford him all the information about them in my power; and I doubt not after his inspection he will be able to appreciate more fully than he has vet done my remarks on "Home and Foreirn Mines." -Observing an enquiry from "Speculator," under the heading his inspection he will be able to appreciate more fully than he has yet done my remarks on "Home and Foreign Mines." In conclusion, it gives me great pleasure to be able to inform you

In conclusion, it gives me great pleasure to be able to inform you that in addition to the great—I may say magnificent—discoveries made at Esgair-hir, Grogwinion, and Frongoch, most excellent discoveries have also been made at the Llwyn Teify and the Aberystwith mines, and that mining in the county is looking more prosperous than for very many years past; in fact, where capital is fairly expended good results cannot but be obtained; and no mines in the kingdom are more deserving of capital, or can be worked so easily and advantageously as the mines of Cardiganshire.

and advantageously, as the mines of Cardiganshire. Goginan, Aberystwith, May 19. ABSALOM FRANCIS.

### HOME MINING-A LUGUBRIOUS VIEW.

Sir.—Brilliant as things have been put forward the last two or three years on paper, with regard to puffing speculations, the balance-sheet at the end of 1873 will unfold a sad disappointment to Sir,—Brilliant as things have been put forward the last two of three years on paper, with regard to puffing speculations, the balance-sheet at the end of 1873 will unfold a sad disappointment to many investors, who are charmed with high sounding names as directors, and whose experience in guiding such an incomprehensible pursuit to men whose occupations and thoughts go no deeper than the surface, hence the immense losses in what are termed mining investments; and unless a speculation is brought out at an immense premium the stock is thought nothing of. Some 40,00%, or even twice the sum, is frequently swallowed up in preliminary expenses, and little or nothing done for the money. These observations not only apply to the notorious foreign El Dorados, but many "home investments," so called, are little or no better. Men who write fiction that reads like truth frequently succeed better than the plain matter of fart persons; but mark the end!—1825, 1835, 1845, 1855, and 1865 were all years of instality, with a few ups and downs intermediately. The crying evil is, and has been for years past, that the granters of setts are so narrow-minded that they give little or no encouragement to home speculations. At the coming effections candit its should be questioned on this point strictly. Many of them know not their own interests, or Great Britain? The result is no new mines are being discovered, and no encouragement offered to investors to lay out their capital, for years pro'ally, and at a very great risk, of seeing a penny of such money expended in explorations returned to them; the ent-wprising persons are leaving this country and exert light henselves in foreign parts. If a person applies for a set obstacles are constantly thrown in his way, as the writer can prove. More expensive explorations are necessary in the present day to find out and discover new mines. Coming events are said to cast their shadows before: but these hadows lie deeper in the earth than in new countries. I am alluding to the British Isles, where g

### MINING SHARES-ADVERTISED AND QUOTED PRICES.

SIR,—Your issue is evidently, if I am to judge by the last, No. 1969 (divided by 52 weeks) about 33 years old, and should be regarded, therefore, as entitled to take the highest rank as a mining authority. There is a mass of information, both with regard to British and foreign mines, metals, meetings, and reports, second to none which I am in the habit of reading. I cannot but regret, however, that the prices of mining shares should be open to occasional doubt, by I am in the habit of reading. I cannot but regret, however, that the prices of mining shares should be open to occasional doubt, by reason of your obtaining the notices of sales not always from dealers in an open market, where buyers' rates and sellers' rates should have some fair relation to each other, but from sellers who have the power of effecting sales at fabulously high prices, while your advertising columns show that others declare they are holders and sellers at fabulously low ones. I pass by the shares in one mine, for instance, though in your price list these are quoted at 5%, 5%, because, though they occasionally appear in advertisements at much less, there is evidently nothing so striking in the repetition as to provoke general amazement; but in the case of another mine I may be forgiven for making a halt. These have been sold by some folks, and I could mention names, at from 4½, 5%, but are now priced (by whom?) at 2%, 2%. Why, by all that's fair and aboveboard, can this be? And yet your advertising columns teem with offers at from 8x; b. 108. lately, to at most (say) 18s. What is the honest truth of the case? The one or the other should be exposed. Surely those who can boldly proclaim themselves in love with this mine should have some better method of ridding the market of the depreciators of this stock than the mere knack of covertly abusing them. Why does not the seller at 2%, 2% offer to buy from anyone who can purchase from the detractors; and offer to bind himself, if he be a monied man, to buy from all such as will sell at a price he will publicly name? It strikes me that it would materially serve the general public if you could contrive to publish on one page the mines for which prices are quoted in the open market or Stock Exchange, and on another page those mines which are simply dealt in by outsiders at whitever they can get, stating the absolute authority for the prices therein quoted. I know one dealer certainly, and there may be many, who, though it is possite for him to say my price

this the more as he recalled the glowing panegyries in regard to one and all of these followers in the wake of the great Van or Devon Consols?

this the more as he recalled the glowing panegyries in regard to one and all of these followers in the wake of the great Yan or Devon Consols?

I do not mention these for the sake of drawing especial attention to any one man or body of men who are known to have advocated and still to advocate any one or other of these mines, so much as for the sake of calling your attention on behalf of the Mining Journal and the general public to the crying necessity there is for some check which it may be possible for you to prepare against winful traders in general on mining credulity. There is great need probably within the charmed circle of the Mining Exchange for the output of some effect which it may be possible for you for some of the form of the control of some effect of the Mining Exchange for the output of some effect to show from time to time what can honestly account for a rise or fall in prices. In railways, banks, and other commercial undertakings we can generally see public opinion directed by public and well-authenticated facts, especially for any serious change in market prices; but who can see such a state of things as mines quoted at 2½, 25; in the same public organ of values contrasted with 8s., 10s., or 18s., or at 5½, 5½, and, it may be also, 2½, 3½. There is something rotten in the State of Demmark. Forgive me another remark, and I have done. Correspondence such as "Japhet's" savours more of personality and word-mengering than of sober science. It may be provoked by something personal on the other side,—no matter. Let the "broker in Grace-church-street," so much referred to, fight his own battle—that will be best fought by the facts he can produce for fair commercial men to consider, and if he be a miner, either of ancient or modern training, the clients he has would rather see him committing himself to an open vindication of his various treasures than to a mere bandying of words of ridicule at the hands of any elever "Japhet," though he dated his epistles from an Ark, or had anthority from Noah himself

It has frequently been explained that in shares, whether mining or other, it is impossible to bring the quoted price and the intrinsic value into accord with each other; all, therefore, that can be done is to give the prices at which sales have been effected, taking care that such sales are properly vouched. "Pro Bono Publico" admits that the sales take place at the prices we publish, by declaring the existence of "seliers who have the power of effecting sales at fabulously high prices," and he does not attempt to prove that any business has been done at the lower price he mentions. It is not, more over, a general principle of business to make a public offer to clear the market of all commodities which the majority consider command too high a price; and in the case of industrial securities of all kinds the purchases are usually made upon the prospects as estimated by the purchasers, more especially when the concerns are expected for a year or two, and calls are not improbable; but purchasers rely upon the prospects, and will, doubtless, he well repaid for their confidence. Some shares in which dealings almost hourly occur in the Stock Exchunge or Mining Market can be quoted to the fraction, and the prices will be readily obtained through any broker, whether it be desired to buy or to sell; but where the dealings are tex, or confined to a limited mumber of dealers (say a Leeds, a Glasgow, a Liverpool, or a Sallsbury connection), sales in the open market would be altogether impracticable, and the attempt to effect them would be as disheartening as the attempt to sell any commodity at ret ill prices to the manufacturers of the same class of goods. Inability to sell at quoted prices does not invariably prove that too much is asked, and many mines which are almost privately managed, so that shares in them would be quite unsaleable in the market, have a value set upon them by those interested, which experience has tanget them is not at all exorbitant.) [It has frequently been explained that in shares, whether mining

### THE SCIENCE OF INVESTMENTS.

THE SCIENCE OF INVESTMENTS.

SIR,—Whatis the Future of Cornish Mining? The latest quotations in your valuable columns of tin we re 140% to 142%, and of copper 100% per ton. West Wheal S-ton from dividends has had to make a call of 7%. 15s. per 400th share, the loss the past 12 months having culminated in a debit balance of 3101%, while the market value of the entirety has declined to 12,000%. East Pool has a debit balance of 5251% outstanding, yet a dividend of 2s. 6d. per share was declared at the recent audit. Why not have made a call, as in the case of West S-ton? It is true that West S-ton has passed into your calling list, still East Pool remains among the dividend mines. Surely the financial position of the two properties are somewhat analogous. The public appreciate the true position of the two mines, and with all the bolstering up East Pool has declined during the current year about 40,000% in current value. Again, East Basset showed a loss of 1947% on the quarter, and involved a debit balance of 2173%. There was much dissatisfaction expressed at the meeting. Is this mine an existing property, or is the future wholly a speculation? The workings involve an annual loss of (say) 3847.

Again, West Frances has a debit balance of 591% 19s. instead of a credit in favour of shareholders? Pray why should this mine remain in your Dividend List, and be saleable at 22,500%. The outlay has been 26% 13s. 9d. and aggreeate dividends 3% 13s. 6d per share, yet the mine has been at work for 35 to 40 years. Cook's Kitchen, also, is working at a loss of about 170%, per month, although it took 50 years to change from copper to tin. The dividends of Dolcoath last year were 10% 12s. 6d. a share, and for the past three months only 1% a share, while the market value has become depreciated about 70,000% since the close of 1872. The general complaint is the high prices of coal and materials and of labour. Will the former ever recede to the old and normal values? I say, No. And will emigration of miners cease from Conwall to Amer

home industries.

The Van, as predicted in my Annual Review in January last, is all but'certain to "cap" the dividend mines for 1873. The first quarterly payment having been 12,000%, or 273 per cent. in comparison with the "Veteran tin mine" of Cornwall. It is stated that operations were carried on for 15 years to effect the transition from a non-dividend copper to a profitable tin property. Tincroft quarterly dividend of 9000%, places this company at the head of Cornish mining enterprise. Again, Carn Brea dividends, at the rate of 12,000% annually, render the shares cheap at ruling quotations. The introduction of the fourweeks settlement, or 13 months to the year, has effected no good among the workruen. The miners continue to emigrate, and though Captain J. Thomas is said to have stated that he knew of many men Captain J. Thomas is said to have stated that he knew of many men earning 6l. a month (say 78l. a-year), yet a spirit of growing dissatisfaction prevails, and great inconvenience is felt from the already scarcity of labourers: 30 years ago tutworkmen were content with 25t to 30t a-year, but then fish and vegetables were exceedingly cheap—i.e. pitchards 20 for a penny, mackerel 12 to 20 for a shilling; hake and cod-fish were abundant, and at the command of the most necessitous. What are the progressive mines in Cornwall doing? Is South Condurrow again to appear in the Dividend List, and when? This property sells for 42,000.—the highest market value of any mine, save West Basset, standing to the south of the Carn Brea Hill. Basset declared a dividend of 30s, per share in August last year, but I am not aware of a single dividend from any one of the many properties extending from Camburge to Gwennay during the current ram not aware or a single dividend from any one of the many properties extending from Camborne to Gwennap during the current year, and situate within this range. In fact the present aspect of Cornish mining tends wholly in one direction—namely, retrenchment—and the first duty of landlords is to lessen the dues. The dues at Dolcoath were 980l., and the profits only 4182l., rather more than 23 per cent. Is it not monstrous that the landlords should receive such a slice of the produce, even out of our greatest and most brilliant prizes? And if such be the tax on the best dividend mines how much more severely must the impost be felt by the struggling and received. more severely must the impost be felt by the struggling and non-dividend undertakings—as, for example, Botallack, South Crofty, West Tolgus, South Frances, Providence, St. Ives Consols, West Seton, Seton, North Roskear, Crenver and Abraham, Margaret, and Great Wheal Vor. Yet, notwithstanding all the heavy costs and taxes on Cornish mining, there is a clear lining tinging the clouds that depress enterprise in them; while practical subscripts can reint to green. enterprise in them; while practical authorities can point to several neglected properties that must soon become recognised, as from disries already made and promising point will assuredly enter the Dividend List. oints R. TREDINNICK, Consulting Mining E 32, Fleet-street, London, May 21.

### EMMA MINE-"CIRCULAR MINING."

SIR, -The following are extracts from a monthly publication, by a consulting mine sharedealer, and may be now referred to as evidence

information within our knowledge was of such a character as to leave no doubt in our minds that a heavy decline in the price of the shares was inevitable."

In May, 1873, he writes:—"In 50,000 shares, 202. (fully paid)—present price, 62, 15s. to 71. We do not profess to be prophetically gifted, but the information we receive from our private agents in the different mining centres enable us to form pretty correct estimates as to the commercial and investing value of the various mines introduced from time to time to the notice of the public. The practical value of such information has been of pecuniary service to those of our readers who were induced to subscribe for the Emma shares at their par value—202. We have always contended that the shares were never worth the price, and the result has proved the correctness of this opinion." Can assurance further go?

N.

### MR. PARK, AND THE EMMA MINE.

MR. PARK, AND THE EMMA MINE.

SIR,—Some of your correspondents have already drawn prominent attention to the communication recently addressed by Mr. Park to the shareholders in the Emma Silver Mining Company, and much discussion, I see, has resulted therefrom relative to the "explanations" which Mr. Park has put forth as to his connection with the purchase of the mine and its sale to the present company.

It is evident that many of your correspondents are well and fully informed upon this and other points in connection with the inception, progress, and position of this now historic enterprise, but for their further information allow me, Sir, to supply some missing details, which should be known at this most important juncture in the career of this company.

tails, which should be known at this most important juncture in the tails, which should be known at this most important juncture in the career of this company.

The following facts, elicited from Mr. Park under oath, before Vice-Chancellor Wickens, throws some curious light upon matters which at present are not very clear to the minds of the shareholders:—

Mr. Park (cross examined by Mr. Hawkins): I came here in September last. I made a sale of one-half of this mine for 400,000/., which I put down in the market at 1,000,000/. Isold one-half absolutely by verbal contract for 400,000/., which would be 100,000/. Isold one-half absolutely by verbal contract for 400,000/., which would be 100,000/. Isold one-half at the same proposed to put it on the market here, and to offer it to the public. The parties to whom I sold it, after negociating for some time, perhaps from four to six weeks, and getting their report, introduced me to Mr. Grant as taking this contract off their hands. Mr. Grant took the contract by agreeing to pay me the 400,000/., which he did, and dividing with the party who proposed it to him. he paying all expenses of promoting, and he having the avails of the one-half, at the same price that the parties with whom I originally negociated were to have it -to wit, 400,000/. net, he paying all expenses, and dividing in his way with the parties who had introduced me to him. After I had made this trade originally, when first I arrived here, in September, the mine had increased much in value by further developments, until it is double or quadruple now what it was at the time it was offered on the market. That accounts for the enhanced value of the shares at the present time—from the further development of the mine. Mr. Grant pressed this and made those disbursements, and received his 100,000/.

was at the time it was offered on the market. That accounts for the channes fr. Grant pressed this and made those disbursements, and received his 100,000 ri after it was all concluded.

Mr. HAWKINS: Do you mean that he received 100,000/, further?—Mr. PARK fo, 100,000/, net. When you ask me what I paid in the promotion of the mine we purchased 5000 shores of the stock (shares), as is always done in pranoting all adjunctions of the stock (shares), as is always done in pranoting all adjunctions of the stock (shares), as is always done in pranoting all aid another 100,000/, and then they were my shares. After the original one-half r 25,000 shares, which were offered to the public had been taken, Mr. Gran lowed me his account, from which he showed me that he had received less than 2 per event, on the whole amount, for his services, after deduct ut the disbursements which he had made. All this was the original contract will fr, Grant.

fr. Grant.

Mr. HAWKINS: I am asking you a simple fact—whether or not you paid him 10,000%, and you say 200,006%. Did you pay him anything in cash?—Mr. ARK: Yes.

Mr. HAWKINS: How much in cash?—Mr. PARK: The whole 500,000%, paid by the company was paid to me. I gave Mr. Grant his 100,000%, which reduced it to 000% and 1 a paid to me.

fr. HAWKINS: How much in eash?—Mr. PARK: The whole 500,000f, paid by company was paid to me. I gave Mr. Grant his 100,000f, which reduced it to (000f, and I also gave him my cheque, which I think was nearly another 100,000f, the shares which belonged to me, after he had purchased the mine, and that de nearly 200,000f. I paid him.

Ir. HAWKINS: How much has he kept of that 200,000f.?—Mr. PARK: He has wn to me about 20,000f, or very little less, and I thought it too little, and I de him a further consideration after we had gone all through. Ir. HAWKINS: How much?—Mr. PARK: By giving him a commission on the er shares I had.—Mr. HAWKINS: What does that come to?—Mr. PARK: H. HAWKINS: What does that come to?—Mr. PARK: H. HAWKINS: What share the still.—Mr. HAWKINS: Whote of the Mr. PARK: I counct tell.—HAWKINS: Whith 20,000.?—Mr. PARK: I think it might amount to from 600, to 30,000f.; for the reason that it was contingent upon what the shares sold and the shares increased in value in consequency of important developments.

to day what it was when first offered to the public.

Mr. Park here states under oath that the mine had quadrupled in value since he sold it to the British public. If this be the fact, will Mr. Park kindly inform us the value of the mine when he sold the property, for if it had quadrupled in value, as he stated, it is clear that when he sold it the mine must have been worth many hundreds of thousands of pounds less than nothing.

For the further information of those interested I subjoin a copy of the original contract made between Mr. Park and the stockholders in the New York Corporation, of which General Baxter was the chairman:—

whereas, the undersigned were owners of stock in the Emma Silver Mining Company of New York, as follows:—H. H. Baster, 10,875; Warren Hissey, 5132; Robert B. Chisholm, 5210; James Smith, 3224; J. R. Walker, 906; Sarmel S. Walker, 905; D. F. Walker, 905; M. H. Walker, 905; Francis D. Clift, 905; M. M. Cunnington, 228; Wm. M. Stewart, 5000—24,900 stares. And whereas the Emma Silver Mining Company aforeaid, represented by T. W. Park, has sold its real and personal estate to the Emma Silver Mining Company (Limited) of London, recording to the terms of an agreement made by T. W. Park, represented as vendor, und by said agreement the vendor was to receive the proceeds of (25,00) twenty ive thousand shares of said company in cash and the same amount in stock—to xit, twenty-five thousand shares. And whereas, the undersigned are entitled to sective from the fifty thousand shares in the Emma Silver Mining Company Limited) the following number of shares, or the proceeds of such shares—to xit:— [Here follow same names and number of shares as above.]

And whereas the said Park has contracted to pay, and has paid, large sums of noney in selling said shares or portions of them, and has given his time, and processe to give his time in the future, to the sale of the shares until they are all isposed of;

And whereas the said shares of said Emma Silver Mining Company (Limited) act with a said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas the said shares of said Emma Silver Mining Company (Limited) and whereas

sposed of;
And whereas the shares of said Emma Silver Mining Company (Limited) not sold
to be deposited with J. H. Puleston, or such person or persons as may be agreed
non between Messrs. Grant and Co., of London, and said Park, until the same
e sold, and when sold the sale or sales are to be on joint account of all the owners
shares, and the proceeds to be divided pro rata. Now, in consideration of the
remises and the services hereafter to be rendered by the said Park, we agree with
the said Park as follows.

and the services hereafter to be renuesed.

Park as follows:

t the said Park shall attend to the sale of said shares in which we have
t the said Park shall attend to the sale of said shares in which we have
t shall avail now as on emises and the services hereafter to be rendered by the said Park, we agree with said Park as follows:—
.—That the said Park shall attend to the sale of said shares in which we have interest, and shall pay all commissions and charges which he has agreed to pay, may hereafter agree to pay; and as fast as said shares are sold shall pay, as on shares we own, or are entitled to the proceeds of, the sum of \$50 per share, in ited States currency, by draft on New York, sent to us respectively by mail thin fifteen days after any sale of shares, and on those already sold, within fitteen so from the excution and delivery of this agreement, paying the undersigned on he sale, as it may be made, his pro-ratio on the shares sold, without any rebate on a secount whatever, except as hereinafter stated. Said Park to report to each sub-yletter, on the let and lith of each month, from London, the number of account whatever, except as hereinafter stated. Said Park to report to each withing the said shares last report, and an account showing what each of us respectively mittled to receive, and also an account showing the unmber of slares still reining on deposit and unsold, the said Park at no time retaining in his hands any disbelonging to us, or either of us, under this contract.

—The said Park to retain for his own use and benefit all sums he may receive said shares belonging to us respectively beyond said sum of \$50 per each share to the said sum of \$50 per each share sold and to be sold, together with any dividends that may be payable recon beyond the said sum of \$50 per share, to be paid as aforesaid on the shares opposite our names respectively in this agreement. And we hereby agree, in of a deficiency, and we hereby authorise said Park to retain from the \$50 per for be bard the said sum of second parks guarantee of title to the Emma Silver ning Company (Limited), of London.

—If the said Park shall at any time ad cance to us respectively any sum beyond at we are entitled to receive he may deduct the same from the next amou

shall not be called upon for any sum for my services or disbursements except as expressed in said contract, and I agree to carry out the agreements hereinbefore mentioned to be performed by me.

In witness whereof I have hereunto set my hand this 9th day of December, 1871.

W. Park (By his attorney in fact, Wm. M. Stewart).

T. W. PARK (By his attorney in fact, Wm. M. Stewart).

Is not Mr. Park's statement opposed to common sense to suppose that the original vendors would have entered into this contract to sell their interest at 10t. per share, payable when sold to the British public, and allowing Mr. Park the enormous expenses he claimed

a consulting mine sharedealer, and may be now referred to as evidence of the value of advice which has been offered to intending investors:—
In November, 1872, he writes:—"Emms Silver (Limited): In \$50,000 shares (fully paid)—present price, 22/, to 23/, 108. This mine has just paid its twelfth monthly interm dividend, at the rate of 18 per cent. per annum, and is now producing ore of far greater richness than heretofore. We believe these shares will advance in value, and are, therefore, worth buying as a speculative operation."

In December, 1872, he writes:—"Emma Silver (Limited): In \$50,000 shares (fully paid)—present price, 22/, to 23/. This mine has just declared its thirteenth monthly interin dividend, at the rate of 18 per cent, per annum. The recent developments have epened out a richer grade of ore than any previously discovered, that extracted from the bottom of the mine yielding from \$150 to \$250 to \$100 to \$10

well if he had told us whether the Professor's fee was absolute weith the had told us whether the Professor's fee was absolute, or whether a material portion of it was not dependent upon the sile of the mine to the British public? Is it not a fact that nin-tends of Professor Silliman's fee depended entirely upon the success of the sale? Mr. Park, in an affidavit, has affirmed that General Baxter was a full partner with him in all his transactions in the selective Emma Mine; if this be so, how is it that General Baxter appears self and Mr. Park, his partner?

Without the additional light thrown upon the

joint-seller of 10,610 sartner? If and Mr. Park, his partner? Without the additional light thrown upon the matter by the legal without the additional light thrown upon the matter by the legal Mr. Park. Without the additional light thrown upon the matter by the lagst evidence above quoted, it was difficult to understand Mr. Park, statement that he was continually buying shares, not with the view to advance the market price, but because of the increased value of the mine. We now see that Mr. Park's statement is perfectly as far as buying the shares, and also that they were not purchase to support the market; but it is quite apparent what the object really was—to give the shares a fictitious market value. If Mr. Park, in his penitence, not only so sinfully silent upon this question, but (as one of your correspondents has fitly observed) in the which he has stated "suggests falsehood by the suppression of trulip. These have become questions of vital importance now that the shareholders are about to be asked for additional capital, to pay in Park the advances made by him to the company to enable it occurrence in the parket of the state of the

time its regular monthly dividends, by which credulous shapers were misled into the belief that Mr. Park's statement, under oath, was really true—that the mine had actually quadr or quintupled in value since he exercised an abnormal self-abore. by sacrificing it to the British public for such a nominal amount 1,000,000l.!—May 21.

ONE BEHIND THE SCENE,

### THE EMMA MINE.

TO THE DIRECTORS AND SHAREHOLDERS OF THE EMMA MINING COMPANY (LIMITED).

It will be remembered by many of you that, at a meeting of share It will be remembered by many or you char at a freeding of slap holders held in May last, when the astounding reports made by the Hon. Brydges Willyams, Hon. W. M. Stewart, and B. Sillimanwar read by the Chairman, Mr. Moscrop made a few remarks, stain that Mr. Park had informed him I was a "bear" of 1600 slared the steck—that I had so told Mr. Park—that I came to him (Pah. Hon. Brydges Willyams, Hon. W. M. Stewart, and B. Sillimanum, trad by the Chairmann, Mr. Moscrop made a few remarks, sting that Mr. Park had informed him I was a "bear" of 1600 shares the stock—that I had so told Mr. Park—that I came to him (Parl and begged for the stock—that I had a letter from Salt Lake, suit that the shares would reach 100/—that most extraordinary long of or had been discovered, and that unless Park would greated in the May meeting. Now, I had made no public demonstration lefat this to depreciate the value of the stock, but my indignation may aroused in consequence of the statements made by Mr. Mostra and I acted accordingly. The facts in connection with this mater are as follows:—I did sell about 1200 shares of the stock ason as I learned Mr. Park had disposed of the whole of the vendor's share, less 25 shares, which were retained by the directors to make them sighle officers. Mr. Park asked me in confidence what amount I halsold. I replied that if he would not mention it to anyone I would tal him. He faithfully pledged to keep the matter a secret, and law him the information. I asked him if he could procure me 160 shares, and I would pay him the market price; or, if he wait borrow them for me, I would give him the money. His peply was that he had no stock whatever, except 500 shares he had profined a day or two before at 27t. 10s.; that he had promised 200 shares he had profined a day or two before at 27t. 10s.; that he had promised 200 shares at the supprice. These shares I purchased. I had received no letter five anyone saying that the shares would go to 100t, nor did I statem such thing to Mr. Park, or that I was ruined, &c. This was simply one of the many tricks and artiflees used by Mr. Park to apprease the value of the stock.

On that occasion (the May meeting) I asked permission of the Chairman to reply to Mr. Moscrop, who seemed disposed to indulg in insinuations and statements of a very unjustifiable mature. If request was granted, and I then recounted the facts which hadounder my

things."

It is poor consolation, perhaps, for damaged shareholders to be flect that they were induced to purchase Emma stock because person in high official stations of England and America were lending the names and influence to the scheme. It is certainly to be regeted that one occupying Gen. Schenk's high position should have sun indirectly aided in foisting upon the public a speculative enterprise which has turned out so disastrously. But he was deceived, saming others were, and has, doubtless, long since regretted the part herm led to play in the great Emma farce. It is not difficult to probe the end. The recent action of the Emma directors certainly "poins a moral and adorns a tale." It may be interesting to enquire whelm the directors in exercising their borrowing powers intend to draw upon their own personal resources or those of the company.

In all seriousness the Emma bubble is a national disaster. America offers many profitable fields for the investment of English capital, each and all of which must suffer because of this giguid swindle. It is only by a prompt and unqualified condemnation the iniquity practised by the vendors of the Emma that America can relieve themselves of the national reproach thus fastened upon them.—Lampham Hotel, May 23.

James E. Lyon. is poor consolation, perhaps, for damaged shareholders to be

### UTAH SILVER MINING COMPANY.

UTAH SILVER MINING COMPANY.

capital of 140,000%, and its serfy was issued Jan. 31, 1872, of which I am sorgh state that I am a holder. On Feb. 28, 1873, special resolutions were passly wind-up the company, and since then a new company was formed, called the Utah Silver-Lead Mining Company (Limited), to work the same property, alter the wreck and disaster that befel the old one. As a shareholder, I was opposed the management of the old company, and the constitution of its board of directs in whom I had no confidence, as their interest appeared more devoted to using the price of shares, regardless of the intrinsic value of the mine, and at the same property of the mine and the same property of the mine that the price of shares, regardless of the intrinsic value of the mine, and at the same property of the mine from appearing in the Manag Journal. Other well and left mately conducted mines have weekly reports in the Journal, but the Utah Simulation of the mine from appearing in the Manag Journal. Other well and left mately conducted mines have weekly reports in the Journal, but the Utah Simulation of the mine from appearing in the Manag Journal, but the Utah Simulation of the mine from the sound of the mine from appearing the subject of the mine from the subject of the mine from appearing the fact there are subject to the subject of the mine from appearing the subject of the mine from the subject of the subject of the mine from the subject of t

### THE BODMIN DISTRICT.

ide. The

THE BODMIN DISTRICT.

Sig.,—The above district is nearly the best customer of the Stat Cornwall. A few months ago we had Hammett and Reperty, a Belowda Beacon; and yet this district has always been the be county, and has yielded more failures than any other. My not in the last 20 years no less than 32 mines have been worked in it companies, and that 24 have proved utter failures, while none opermanent dividends. How is this? It cannot be caused entit ductiveness of the lodes, because several mines of the district with some success by individuals. Is not, then, but managene it all? In speaking of the Bedmin district, I mean the purishese Cardinhum, Lanivet, and Lunivery; but not St. Blazey, whice excellent mines. From time to time we have had able account

ing districts further west; but a good account of the above district remain view of is much to be desired.

TERRAS MINE.

\*\*TERRAS MINE.

\*\*TERRAS MINE.

\*\*TERRAS MINE.

\*\*TERRAS MINE.

\*\*Tefer to the statement following: "Once upon a day, end does not like to that is if by the word "Mapper" he means me, end does I refer to the statement following: "Once upon a day, end does I refer to the statement following: "Once upon a day, and asked for a loam, "&c. To what "Mapper" that can apply I know that it cannot trathfully apply to me, for I have not seen Japheth's than two years, and for that period have held no conversation with assed him once, consequently I could not have asked for the favour have I for the like period asked any other broker for such a tavour.

\*\*As Period Mines Min

conventue penny trumpet. Fernaps he will be good choogs, that the few words incidentally used by me would have drawn respondence with the Graeschurch street broker, for which I have inclination, and who, while complaining of "personalities," is in the world. When I said to a friend in London that I was Japheth's "first letter, he said to me, "If you take my advice of the kind," &c.
hat has been written is beside the subject originally started, and hereof. The questions that were intended to be discussed were "puffing," or was there not, in regard to Terras shares? Have those shares "intrinsic values" for the money paid, which was gla as & 10s. per share? Into those questions I shall not at pre-

TERRAS MINE.

TERRAS MINE.

TERRAS MINE.

"(two) and "A. F." (one). The animus displayed in end, Mr. Symons, is anything but fair.

on the following sentence in "Japhets" letter:—"With the ing underground, boasted of by Mr. Symons, we all eard him boast, nor have I seen anything of the sort in a needote which will show you that he knows more to accept the within with. A few yearsago I was with him ordurrow, where there was a good course of coperore, et breaking some of the ore, what he thought it was d—"I think it is worth abeat 800, per fathom." Now, as the exact value we had put on it, and which no one afterwards went to an end driven by tutwork men here), and he was asked what he thought the men ought id—"I suppose you give them 80, per fathom for this." was \$4, 10s. These incidents show that Mr. Symons inning, although never a labourer in mines. What observation. I think it fair to him that you should be the start of the sta ing, although never a labourer in mines.

evation. I think it fair to him that you shou

MINE AGENT.

May 21.

A WORD OF ADVICE.

period of the publication of the multitudinous self-up is from Mr. Barnard, amounting his astounding imaginal strong Mr. Barnard, amounting his astounding imaginal strong Mr. Barnard, amounting the following the following self-up in the follow

der of Original Correspondence see to-day's Journal.]

### Meetings of Public Companies.

SOUTH PHENIX TIN AND COPPER MINING COMPANY.

inary general meeting of shareholders was held at the Guild-

e House, on Wednesday, the 21st inst.,
Mr. J. R. MACARTHUR in the chair.
SILLIFANT (the secretary) read the notice convening the

stated that they had again the pleasure of press stors stated that they had again the pleasure of presenting siteet and report of the managing director and captain, pose of preparing tin for the market have been purchased I as specifily as possible be crushed and made ready for sale. South Condurrow Mine, has been instructed by the direc-tive are port on the past and present workings of the mine, r during the spring has been very unpropitions for the erec-surface operations, and very considerable delay has conse-t. The directors are led to believe (as has been the case in his property will be found to materially increase in value as and the locks are opened to a greater depth. They are also other half yearly meeting sales of tin will have been effected, declare a divident.

port of Capt. W. C. Vivian was as follows:-

Capt. W. C. Vivian was as follows:—
at your request, inspected South Phenix Mine in your company
he following report thereon:—The sett is very extensive, and
part of the celebrated Phenix mining district, the Phenix
ne so rich and profitable in both copper and tin, being within a,
half a mile—to the north. There are several well-known
ground, two of which are now being developed by means of a
ry engine. Of these I shall refer first to the Green Hill lode, on
cen sunk 12 fathoms from the surface. This lode is not large,
but it has a good character, and appears to be increasing in size
s nature with increasing depth. It is vugly or cellular, and
yetalline structure, which are features highly approved of by
t has already been found to contain occasional ribs of very rich
is to push on the sinking on this lode with as much expedition
in that by so doing tin ground will soon be opened out, from
made at a profit.

sh on the sinking on this lote with a most out, from by so doing tin ground will soon be opened out, from the aprofit.

35 fms. south of the one already described, and a shaft ing the same dip, to a depth of 26 fms. from the surface, a cross-cut has been put into the lode 10 ft. in length, the for some 20 fms. in length. The width of this lode is the from wall to wall, and its composition almost entirely ers. "tin peach," which forms the matrix of the principal awall. At the 29 this lode, although yielding occasionally ty, has, on the whole, been rather poor. The shaft being ial in depth is now within 4 fathoms of the 30 fathom sinking), where a cross-cut of a few feet will again strike that it may be found richer in tin with increased depth. this expectation. Should this prove to be so, and the percentage of tin (say 1½ per cent.) considerable profits as its great size and easy nature for being excustate of it being sent to the surface at a very cheap rate, inch has been adopted—that of attaching pumping gear to lodes to a rotary engine—is well adapted for a prelimic lodes to a short depth, but should favourable results be deeper you will then be justified, and find it necessary, also of working, and to provide yourselves with more well require the present rotary engine, which appear will require the present rotary engine, which appear

The joint report of the manager (Mr. C. Pearson) and Capt. James

done as quickly as possible, having purchased a bob and the necessary pitwork. We are very anxious to resume the sinking, as the lode in the bottom of the shaft is looking exceedingly well, and producing good work for tin, and from the beautiful appearance it is presenting there is every probability of seeing even a much greater improvement as we deepen. We have cross-cut the north 8 ft. from the old men's workings west of the shaft, and intersected two branches 4 ft. apart, producing a little tin, and we are driving west on these branches, as from the present appearance of them, and judging from the old men's workings, as seen at the surface, we expect they will shortly come together going west, when we are fully looking forward to meet a productive lode for tin.—Surface Work: We have purchased stamp-axle, &c., on most favourable terms, and have creeted 12 heads of stamps, and intend putting them to work this day to "beat down their beds," and hope in a few days to commence stamping for tin. We are getting on as fast as possible with all necessary appliances for dressing purposes. We are also taking out the ground, and shall lose no time in creeting the horse-whim at Hazledine's shaft for the purpose of drawing the staff. We are pleased to say that the engine continues to do its work in a most satisfactory manner.

The CHAIRMAN said it afforded him much pleasure to meet the shareholders at this, the third annual meeting of the company. Beyond the circumstances narfated in the reports, and the items set

yond the circumstances narrated in the reports, and the items set yond the circumstances narrated in the reports, and the Items set forth in the balance-sheet (which had been duly audited), the directors had really nothing further to add. During the erection of the machinery the necessary mining works—such as sinking and driving—were being carried on, with the view of getting to the riches which they hoped and believed they would find in depth. The managing director was present, who would be glad to furnish any additional information shareholders might desire to obtain; but he would in the first place call months according to read the report

ditional information shareholders might desire to obtain; but he would, in the first place, call upon the secretary to read the report from the mine, which had that morning been received.

The Secretary read the report, as follows:—

Mey 19.—There is no material change in the mine since you left for London. I fancy we have met with the north wall of Grace Dicu lode, as we have met with grante; if so, the lode at this point is about 3 fms. wide, and of the most promising character for the production of tin, although at present the lode is not containing much tin. The stamps were set towork last Monday (the 12th of May), and are working exceedingly well, and the stuff is turning out tin equal to our expectation. The stuff that we are stamping was broken from Hazletine's shaft, of which will be about 30 tons of stuff, and I fully believe that we shall get 1½ ton of tin from the same. We shall lose no time in getting the shaft-bob and rods put in at this shaft and fix a side lift; also erect a horse-whim, so as to resume sinking this shaft with all possible speed. We are getting on with the tin floors as fast as possible, and hope to put one buddle to work to-morrow (Tuesday). The engine and pitwork at Pearson's shaft are in good working order.—James Kelly.

The CHAIRMAN then moved that the reports and balance-sheet be received and adopted.—Mr. Hazledners seconded the proposition.

received and adopted.——Mr. HAZLEDINE seconded the proposition.

The CHAIRMAN said that, as Capt. Vivian was unacquainted with
the district, he had stated that the Phœnix Mine was half a mile from South Phoenix, which might be true with reference to the account-house on Phoenix, and the actual works in South Phoenix, but the two setts actually adjoined. He considered it necessary to mention this fact, because the statement of Capt. Vivian appeared to differ from that which appeared in the prospectus. A sub-committee was appointed to choose the person who should inspect and report on the mine, and Capt. Vivian was chosen; and when his report was received all the directors could do was to send a copy of it, unaltered, to every shareholder, although they knew it contained this topographical error; but he (the Chairman) took this opportunity of exalaining the point.

be every shareholder, atthough they knew it contained this topographical error; but he (the Chairman) took this opportunity of explaining the point.

Mr. C. Pearson (the managing director) believed a great mistake had been made in not having the mine inspected by a man who knew the Caradon district. For instance, Capt. Vivian had not mentioned that one of the Phoenix lodes came into South Phoenix sett, nor was one word said about the cross-courses, which was a most material point, seeing they were the South Caradon and the Great Phoenix cross-courses. It is the opinion of Capt. Simmons, the Duchy agent, that the principal part of the South Phoenix, ore will be found between those cross-courses, and in the Caradon district generally the ore makes a little way from the cross-courses. Another point not mentioned by Capt. Vivian was that all the Marke Valley lodes run through South Phoenix. He thought the mine should have been inspected by a man who thoroughly understands the Caradon districtfor instance, Capt. Hoskin, the agent of Phoenix; Capt. Seccomb, of East Phoenix and Marke Valley; Capt. Holman, of South Caradon, or Captain Nicholas Richards, who thoroughly knew the district, and would not require any information from Capt. Kelly, the manager, to enable them to write a report. Another thing which Capt. Vivian had omitted to mention was the great lole discovered in the Phoenix during the construction of the railway, which came into the South Phoenix sett at a depth of about 30 fathoms. In confirmation of what was stated by the Chairman as to the contiguity of the setts, he might add that it was a distance of about 200 fathoms from the Phoenix account-house to the workings in South Phoenix.

Mr. HOUSEMAN called attention to the last paragraph in the directors' report, which stated that the sales of ore they hoped would shortly enable them to declare a dividend. It appeared from Capt. Vivian's report it would be necessary to erect more powerful pumping machinery. He supposed the directors would fully consider t

had been erected.

The CHAIMMAN said the cost of providing and erecting machinery would be properly chargeable against capital. There is about 4000% uncalled capital, which would be amply sufficient to do what was set forth in the report referred to, therefore the amount raised by the tin found in the ordinary workings, after deducting all costs of stamping, &c., could be justifiably set apart for the purposes of dividend. The directors, therefore, felt themselves justified in holding out the hope that they would very shortly be able to declare a dividend. (Hear, hear.) They were fully impressed with the importance of not declaring a dividend one half-year, and then suspending it for the next; and, possibly, he might be sanguine, and, perhaps, too sanguine, in expressing himself so strongly; but it is the very strength of mining to be hopeful, and sometimes sanguine. He believed they had fair reason for expressing the opinion set forth in the report. A discussion ensued upon the advisability or otherwise of having the mine inspected by someone acquainted with the Caradon district, which resulted in the matter being left in the hands of the board. The CHAIRMAN said the only objection that appeared to be urged against Capt. Vivian's report was that it was not so encouraging as The CHAIRMAN said the cost of providing and erecting machinery

against Capt. Viviaa's report was that it was not so encouraging as it might have been.

against capt. What's report that a large it might have been.

The report and accounts were received and adopted.

Mr. Macarthur was re-elected director, and Mr. G. Vials was elected director in the place of Mr. G. Baylis.

A vote of thanks to the Chairman, directors, and managing directors. tor concluded the proceedings. .

### EAST WHEAL SETON MINING COMPANY.

A well-attended special meeting of adventurers was held at the mine on Tuesday to consider certain propositions which had been made to them by circular respecting the more effectual development of the western part of the mine, about Cartwright's shaft, for

copper ores.

Mr. Thomas Prvor (the purser) said he had purchased the whole of the plant of the adjoining mine, Wheal Emily Henrietta, and as the copper ground at East Seton could be best worked by bringing in deeper a level from Henrietta, he thought it incumbent on him to offer the East Seton Company the option of taking the plant at the same price which he paid for it. He believed this would be a great benefit to the East Seton Company, and as he was a large shareholder he naturally took a deep interest in the welfare of the mine. It had been suggested to him by some large shareholders that the more prudent course would be to hire a portion of the Heurietta machinery for a few months, and if they pren of the Henrietta machin

special to the control speaks favourably. Six months working on your speak spite my will throw considerable light on the nature of the lodes now under lat an increased depth, and will, I think, show clearly the course which you all follow as to the theorem which you all follow as to atamping general tached to the engline, consisting of small sales of tin, as the stamping general tached to the engline, consisting of stamps, is now nearly gendy to work.

3.—In stating the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the Green Hill lode, I refer to the leading and most all follows the size of the size

chinery, for a period of twelve months, optional with the shareholders as to time (and with power to purchase at a valuation now decided on), the engines and other plant, as set forth on the schedule, at a sum of 25% per month. Several shareholders having expressed their satisfaction at the proposed arrangement, and at the liberal terms which the owners of the plant had consented to take, it was unanimously resolved that the same be accepted. It was also resolved that the operations at Basset's shaft should be discontinued for the present, and all their force be concentrated at and about the former western boundary.

In answer to a question from one of the shareholders. Cant. Pressure stated that

oundary.

In answer to a question from one of the shareholders, Capt. PASCOE stated that
about three weeks they would be able to resume the workings on the copper
round, and he looked forward to a continuance of the productive ground at preent laid open.

SOUTH CARADON MINING COMPANY.

At a general meeting of shareholders, held at the mine on Tuesday (Mr. Thomas Kittow in the chair), the quarterly accounts showed a profit of 2049!. A dividend of 2048!. (4l. per share) was declared, and 3174f. 16s. 5d. carried forward. The following report was read to the meeting.

and 31741. 16s. 5d. carried forward. The following report was read to the meeting:—

Mny 20.—It is with pleasure that I have again to inform you that the mine continues very productive, and to find the purser is enabled to pay you a 4t. dividend. This I consider a very good profit, when we take into consideration the unsettled state of the markets, together with the high price of labour, &c., so seriously affecting such an extensive mine as ours at the present time. During the very wet months of winter some of our shafts we were obliged to suspend; but, in consequence of the water being less, I am pleased to say the whole of them are now being sunk as fast as the nature of the ground will admit.—JOHY HOLMAN.

After which the meeting being made special, in accordance with notice dated May 12, "For the purpose of taking into consideration the subject of the rates which have been assessed on the company by the churchwardens and overseers of the parish of St. Cleer, and making proper provision for payment of the costs which have been and may be incurred in contesting the legality of such rates," it was resolved that "The matter be left in the hands of the purser and manager, to arrange for the best interests of the company."

### MALABAR GOLD WASHING COMPANY.

The statutory meeting of shareholders was held at the offices, Winchester House, on Tuesday,—Mr. Alfred Cobbett in the chair.
Mr. Sydney A. Cobbett (the secretary) read the notice convenient the meeting.

ning the meeting.
The CHAIRMAN said that this meeting was called in accordance with the provisions of the Companies Act, and, as stated in the notice, was held pro forma, sufficient time not having clapsed since the incorporation of the company to have received reports from the mines. The board had taken the opportunity of informing the shareholders The board had taken the opportunity of informing the shareholders what steps had been taken to carry out the operations at the mines, and he now might add that on Jan. 31 the directors, foreseeing the success of the company, sent to San Francisco the necessary instructions to manufacture the machinery at the earliest possible date, so that on March 15 the hydraulic machine was shipped to New Granada. The machinery is of a more extensive character than that for the other mines, because the works to be carried on were of a more extensive character. Through the kind influence of his colleague (Mr. Pechey), their agent (Mr. O'Reilly) had been introduced to Mr. McLean, the manager of the Sweetland and Birdseye Creek Mines, who had rendered very valuable assistance in selecting men fitted for the services required of them, the whole of whom, under the charge of Mr. O'Reilly, left for New Granada on April 26, and he supposed that in a month's time they would reach the mines. The letter received by last mail from Mr. Welton had been published in the Mining Journal, and the board had arranged that information shall be communicated by each mail when anything of importance occurred. The reports on the mines more than confirm the information given in the prospectus upon which the public subscribed for the shares; and the board had taken every step to prevent any delay taking place in getting them to work. Mr. Welton has been engaged in the necessary preliminary operations preparature to the provise of the carried of Mr. O'Reilly, and the machines and every devery devent any the deap of the carried of Mr. O'Reilly, and the machines and every devery devent any delay taking place in getting them to work.

vent any delay taking place in getting them to work. Mr. Welton has been engaged in the necessary preliminary operations preparatory to the arrival of Mr. O'Reilly, and the machines and every detail would be carried out with efficiency and dispatch. Mr. H. Drake and Mr. A. Gray had been appointed directors since the formation of the company, and now retired, but offered themselves for re-election. Mr. J. T. P. Pecher wished to take the present opportunity to state that the directors had the same unbounded confidence in the remunerative value of these mines that they had expressed from the beginning—he referred to Malpaso, Rica, and Malabar. His surprise was not that there had been so little done, but—looking at all the circumstances, and that they had commenced mining in a new and untried country—his surprise was that, considering the short time yet elapsed, so much important work had been completed. Of course there had been delays. He was now specially referring to the Malpaso, but he had no doubt that the advices to hand on June 10 would show better results, and that by the beginning of August they would begin to show profits. (Hear, hear.) The moment he became satisfied that the hydraulic process could be applied at these mines he ceased to admit the possibility of failure.

became satisfied that the hydraulic process could be applied at these mines he ceased to admit the possibility of failure.

The CHARMAN sald his confidence, as well as that of those around him, had in no way altered as to the great value of these mines, and that they must ultimately prove successful. The sole cause of the delay in Malpaso had been that the old Spaniards had worked the auriferous gravel much more extensively than was at first supposed, and, consequently, left behind them an immense amount of waste. He had omitted to mention that the capital of the company, as stated in the prospectus, was 75,000.6., and that 65,000 shares of 1/c each had been issued; there were about 2000 more shares applied for than the number to be allotted.

Upon the proposition of Mr. PECHEY, seconded by Mr. C. O. ROGERS, the retiring directors were re-elected.

rere about 2000 more shares applied for than the number to be allotted.

Upon the proposition of Mr. Pecher, seconded by Mr. C. O. Rogers, the retiring frectors were re elected.

A vote of thanks was then passed to the Chairman, directors, and manager.

The CHAIRMAN acknowledged the vote, assuring the shareholders that they rould continue to use every means in their power to ensure an early success, seling very large shareholders, the interest of the directors was identical with that f the shareholders.—The meeting then separated.

EMMA SILVER MINING COMPANY.—An extraordinary general seting will be held on Thursday, for the purpose of recommending to the directors names of duly qualified shareholders to be appointed directors in place of Mr. Tewing, Mr. Henderson, and Sir H. Silwin Ibbetson, who have resigned; and ving regard to the present financial position of the company, to concur in the dittors exercising their borrowing powers.

WHEAL WHISPER.—The interim dividend of 6d. per share, being at the rate of 10 per cent. per annum for the quarter ending March 31, has just been paid. The water power possessed by the company, and the large amount of work accomplished at a small cost, are considered to confirm the favourable opinions expressed as to the value of the property. Nearly 30,000 tons of the poorest ground in the mine has been treated at a profit of over 100 per cent. on the working cost. The machinery is in good order, and the mine continues to improve.

GREEN HURTH (Lead).—At a meeting of directors, held on Thursday, a dividend of 4s. per share was declared, on 6400 shares. The agent reported that he had never seen the mine look better.

EAST WHEAL GRENVILLE.—At the general meeting, on Tuesday the accounts showed a debit balance of 1624/. 19s. 6d.; a call of 4s. per share was made. A special meeting is to be held on June 4, for the purpose of forfeiting all shares upon which calls shall remain unpaid.

ares upon which calls shall remain unpaid.

NEW EAST WHEAL LOVELL.—At a meeting on Monday (Mr. C. waden in the chair), the accours made up to the end of April showed a debit lance of 9%. 1s. 104. In consequence of the discovery in the mine it was resolved offer the unallotted shares to the existing shareholders at pur (10s.), and if not ken by them within 14 days the purser is authorised to deal with them as he may em fit for the benefit of the mine.—[Captain Kempthorne's report is among the ining Correspondence.]

BLAEN CAELAN.—A; a meeting of the directors on Monday a call BLAEN UAELAN.—At a meeting of the directors on Monday a call of as, per share was made. The managing director, Mr. J. B. Balcombe, reported that the lode westward from Esgair-lif had been carefully re-dialled, and its identity with the Blaen Caelan discovery in the 20 proved. The direction, therefore, of the workings, previously started by costean pit, was, by the advice of Capt. Davis, of Bronfloyd, changed so as to come more across the line of the lode. Mr. Balcombe considered subsequent results were satisfactory; and with respect to the mine proper he had reason to hope that the water-wheel and wire-rope connections with the engine shaft will be completed, and the 40-ft. wheel started to fork the old mine in about ten days. This will greatly economise the future cost in the saying of coals for the undergravate active. tions with the engine shaft will be completed, and the the old mine in about ten days. This will greatly econ saving of coals for the underground engine.

saving of coals for the underground engine.

KILLIFRETH.—The meeting of adventurers was held on Friday, when the balance-sheet showed a credit balance of 48%. It must, however, be remembered that five months' cost are charged against three months' returns, which shows an actual working profit of 80%, on the first three months' working. Mr. E. T. Carlyon, after referring to the gratuitous services which Capts. Googh and Buckingham had rendered, expressed his opinion that their scrives ought to be recognised, and he proposed that they should receive 6% 6s, per month as joint managers, the same to commence from the month of February. This was seconded by the Rev. G. L. Church, and carried unanimously. Capt. Googh, in returning thanks, referred to the expense which was necessarily involved by the managers, especially now that they were on the look out for an engine. A question having arisen as to who was the surgeon of the mine, Capt. Googh replied that they had always allowed the men to choose their own surgeon, and exerted no influence over them. (The agents' report is among the Mining Correspondence.)

SOUTH CROFTY.—The quarterly meeting was held on Friday, Mr. H. Rodd, the purser, in the chair. The financial statement showed a profit on the ree months' working of 1001. The debit balance last meeting was 15021, leaving to debit balance lost meeting was 15021, leaving to debit balance sow. The Chairman read over the proposed agreement with the 1st Pool Company respecting the boundary. There is to be no money payment of either side, except an acknowledgement on the part of the East Pool Company is fiberty to fix some pipes, &c., naderground. It would seem that the holling to

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Bast Pool is of considerable advantage to South Crofty Company, in enabling them to facilitate the working of some very productive mineral ground. Capt. Thomas said if tin held up to the price it was at their last meeting the entire debit balance would have been wiped out. The proposed agreement with East Pool Company was confirmed, and 2l. 2s. per month added to the salary of the junior clerk of the mine, Mr. G. Luke. There was a very good feeling evinced by the shareholders respecting the prospects of the mine, and the very able way in which it is managed. The accounts also are brought up as close as possible, and contrast most favourably with other mines in the district, which are not charged up so close by three or four months; and which, instead of having a large balance in hand, as shown on the face of the accounts, are in reality several thousand in debt.—Western Morang News.

### SOUTH WALES INSTITUTE OF ENGINEERS.

[Continued from last week's Mining Journ

Mr. BARROW's experience with compressed air led him to believe Mr. Barrows experience with compressed air led him to believe that the temperatures given by those experiments were, to some extent, due to the friction of the pistons in the air-cylinders, and not altogether to the latent heat in the air, and asked Mr. Snape if he had made experiments to determine this?—Mr. Snape said his experiments went to show that at a piston velocity of 160 feet per minute, the increase of temperature, due to friction, was 20°.

Mr. Thomas Forster Brown said that the experiments showed this result at a piston velocity of 160 feet per minute, the pingle of the periments of the property of the periments but at the higher

this result at a piston velocity of 160 ft. per minute, but at the higher velocities it did not appear what increase of temperature was due to friction.—Mr. SNAPE caid the temperature seemed to run up

to friction.—Mr. SNAPE caid the temperature seemed to run up at once to a certain point, with a given pressure, and during continued working afterwards at that pressure the air increased in temperature very slowly, and this increment was probably due to friction.

Mr. COPE PERRCE said that, if he read Mr. Snape's diagrams correctly, about 8-10ths of the power applied by the steam-engine in compressing the air on the surface is utilised by the air-engine underground, if the back pressure is included. But, of course, to arrive at the effective horse-power or work done by the air-engines, the back pressure should be deducted, and when this is done it is reduced to 123-horse power, or about 73-3 per cent. of the power applied on the surface. This is really what we want to arrive at, and the compressors and compressed air can only be treated as the intermediate parts or agents for transmitting the applied power. It is also to be observed that the diagrams of the compressors show an unexpected pressure of about 4 lbs. per square inch. At the beas also to be observed that the amgrams of the compressors show an unexpected pressure of about 4 lbs, per square inch. At the beginning of the stroke air at the atmospheric pressure compressed into 2-7ths of its original bulk would be about 30-5 lbs, pressure, but one diagram shows this pressure to take place only after 5-7ths of the stroke, although the pressure commenced at 3 lbs, above the atmosphere; this may possibly be accounted for by leakage past the air piston. In respect to the increase of some 4 lbs, indicated by the compressed air at the bottom of the util in excess of that on. atmosphere; this may positify be accounted for by leakage past the air piston. In respect to the increase of some 4 lbs., indicated by the compressed air at the bottom of the pit in excess of that on the surface, the weight of the column of air equal to the depth of the pit (365 yards), and compressed to 37.5 lbs. per square inch, is not sufficient to account for it; but Mr. Snape's statement is confirmed by other experiments, one of which at Ryhope gave 40 lbs. pressure at the pit top, 46 lbs. at the bottom, a depth of 518 yards, and 45 lbs. at the hauling engines, after the air had travelled a total distance of 1505 yards. It would be desirable to know whether the pressure of the air lowered whilst the hauling engines were at full work, and if so, it is probable its duty was partly derived by the power stored in the air receivers, or expansion of the air therein, in addition to the power transmitted direct from the air compressors on surface during the time the engines were running. To arrive at the true duty that can be derived from compressed air, in comparison to the power applied, it was, he thought, requisite that there should be a continuous working of the air compressors, and of the engines worked by the compressed air, under conditions that would maintain regular pressures at the surface and underground, and that diagrams thus taken would show the true percentage of loss of power in transmission. To get high duty he thought the air-engines ought to be large enough to do the work without requiring air at very high pressure. If the air compressor has a cylinder of 40 in. diameter, and compresses the air to a pressure of 15 lbs, above the ought to be large enough to do the work without requiring air at very high pressure. If the air compressor has a cylinder of 40 in. diameter, and compresses the air to a pressure of 15 lbs. above the atmospheric pressure, with a piston velocity of 250 feet per minute, 98-979 horse-power will be expended. The power to be obtained from this air (at 15 lbs. pressure) forced out through half the stroke, will be 71-4 horse-power, representing a duty of 72-136 per cent. Again, with an air-compressing cylinder of half the area, working the pressure of 45 lbs. per source inch over the atmosphere with a will be 11-4 horse-power, representing a duty of 12-15 per cent. Again, with an air-compressing cylinder of half the area, working to a pressure of 45 lbs, per square inch over the atmosphere, with a piston velocity of 250 ft. per minute, the horse-power expended would be, as before, 95-979, but the power to be obtained from the compressed air at 45 lbs., forced out through one-fourth of the stroke, will be only 53-55-horse power, or a duty of only 54-102 per cent. of the applied power. With the temperature of the compressed air at different pressures being taken into account, the difference of the percentage of duty would be still more marked. He would remark that in comparing the relative value of compressed air and steam-power for use underground it should not be forgotten that a portion of the former, apparently lost in transmission by compressed air, is in fact utilised by the reduction of the temperature and increased ventilation of the mine whilst the air-engines are working.

Mr. SNAPE said there had apparently been an error made in taking off the diagrams; the atmospheric line should have been higher up. It was an error of diagram, not an error of calculation of the power.

Mr. A. J. STEVEN's thought Mr. Snape must not assume the errors had arisen because the diagrams were wrong, for it must be remembered that the cylinder had something to do with it in communicating heat to the air that is being drawn in and passing through before the return stroke, and the effect of the temperature is, of course, apparent on the air in raising it at once above the atmospheric line.

Mr. Cope Pearce did not think it would have time, be-

before the return stroke, and the effect of the temperature is, or course, apparent on the air in raising it at once above the atmospheric line.—Mr. Cope Pearce did not think it would have time, because at the instant it must rise up to 4 lbs.

Mr. Jas. M'MURTRIE would wish to ask Mr. Snape whether for an engine placed at the bottom of the shaft he considered it was more economical to use compressed air, or to take steam down the pit for its use?—Mr. J. SNAPE thought it would depend upon circumstances but he questioned whether the steam would not incur cumstances, but he questioned whether the steam would not incur the greater loss by condensation in a deep shaft. Mr. Bassett knew that the radiation from steam-pipes under-

ground was very detrimental to the ventilation, and he hoped the day was not far distant when no engine worked by steam will be used underground, but that compressed air will be the only motive-

used underground, but that compressed air will be the only motivepower applied.

Mr. Barrow said it might be a matter of convenience to some
extent whether they employed steam or compressed air underground,
but there could be no doubt that in either case a loss of the power
applied would occur. He had used compressed air for many years,
and his experience was a perceptible gain in the pressure. In one
case where he used the air some 1700 yards distant from the compressor the gauge showed the increased pressure, and in one case
where they had used steam, conducted at a distance of 500 yards
through pipes well felted and covered with cement, there was a loss
of 7 lbs, pressure from condensation.

7 lbs. pressure from condensation.

Mr. David Thomas had no doubt that great advantages were to be derived by the use of compressed air as a motive-power for use point of the colliery workings, no matter how distant from the shaft, where it would also materially assist the ventilation. This power was now in its infancy, and it behoved mining engineers to give it their best consideration, because it was the only agency that underground, especially as it enables the power to be applied at any give it their best consideration, because it was the only agency that could be effectively substituted for horse-power at the faces of the

M. TRURAN thought that at Dowlais they had been the first to introduce the principle of employing compressed air as a mechanical power in collieries, and after getting over the first difficulties found it answer admirably; they were now about setting some hauling machinery to work by it, at a distance of some 1200 yards from the compressor.

The PRESIDENT thought Mr. Snape had given the Institute a most The Prestrient thought Mr. Snape had given the Institute a most important paper, and he did not know of any subject of greater importance in connection with the working and improvement of collieries. Another paper, by Mr. A. J. Stevens, was about to be read on the same subject, which will come on for discussion at the next meeting, and it would, therefore, perhaps he well to adjourn the further discussion of Mr. Snape's paper until that time.

The following papers, which will come on for discussion at the next meeting, were then read by the secretary:—"On Compressed

Air," by Mr. A. J. Stevens; "On Electric Engines for Underground Use," by Mr. W. Thomas; after which Mr. Al. Bassett read a paper

"On Colliery Consumption of Fuel."

After the meeting a large number of the members dined together, as usual, at the Royal Hotel.

### ROYAL INSTITUTION OF CORNWALL.

The spring meeting of the Royal Institution of Cornwall was held at the Museum, Truro, on Friday. In the unavoidable absence of the President, Sir John St. Aubyn M.P., the chair was filled by the senior Vice-President present, Dr. Jago, F.R.S. The company included Mr. R. W. Fox, F.R.S., Mr. W. J. Henwood, F.R.S., Dr. Barham, Revs. Dr. Bannister, A. P. Moore, H. S. Slight, Capt. Oliver, R.A., Dr. Hudson, Messrs. R. Tweedy, Reginald Rogers, A. Paull, F. V. Budge (secretary), H. O. Remfry, D.G. Whitley, H. S. Leverton, R. N. Worth, S. Pascoe, J. James, and a number of ladies.

The CHAIRMAN, in the course of his opening remarks, said Sir John

cluded Mr. R. W. Fox, F.R.S., Mr. W. J. Henwood, F.R.S., Dr. Barnam, Revs. Dr. Bannister, A. P. Moore, H. S. Slight, Capt. Oliver, R.A., Dr. Hudson, Messrs. R. Tweedy, Regimald Rogers, A. Paull, F. V. Budge (secretary), H. O. Remify, D. G. Whitley, H. S. Leverton, E. N. Worth, S. Pascoe, J. James, and a number of ladies.

The CHAIRMAN, in the course of his opening remarks, said Sir John St. Antyn last year commenced his address of selling attention to the subject of the control of the property of the political state of the subject of the control of the property of the political erist, it had been brought forward again in an amended form. The Council of the Institution, although thinking some amendment still needed, sent in a petition in favour of the preamble, but in consequence probably of the political erist, it had been brought forward again in an amended form. The Council of the meeting of the Royal Archeological Institutes at Exeter, by lending some of the more valuable objects from their museum; this they had agreed to do upon proper provision being made for their security. Their President, Sir John St. Andyn, had been invited to take the chair in the section of the state of the security of the political state of the state of the security. Their President, Sir John St. Andyn, had been invited to take the chair in the section of the security of th

Mr. Hunt's valuable Statistics show that shall lead to has all interfer mereaser.

"The Tin Trade of Cornwall in the reign of Elizabeth and James compared with that of Edward I," by Sir John Maclean, F.S.A. compared with that of Edward I," by Sir John Maclean, F.S.A. In this paper Sir John gave the particulars of the tin coinage of the county at decennial periods from 1577 to 1607, from two books which he had discovered in the Augmentation Office—comparing them with the details of the Stunary Roll of 1905 communicated to the Institution by himself. The coinage payments at the time under notice were 4%, for Cornwall against 15s. 7½d. for Devon per 1900 lbs. The coinage in 1305 ws 985,562 lbs. ayear, and the annual average from 1577 to 1807, 991,979. Taking into consideration the difference in the value of money, the revenue derived by Elizabeth from the Stannaries of Cornwall was far inferior to that of her distant ancestor.

"On the occurrence of Wood Tin Ore in the Wheal Metal Lode at Wheal Vor, in Breage," by Capt. RAGALL. This paper recorded the occurrence at the hitherto unprecedented depth of 200 fathoms in Wheal Vor of wood tin, a fine specimen of which, accompanying the paper, was presented through Mr. Henwood.

specimen of which, accompanying me paper, was presented through Mr. Henwood Dr. HUDSON, of Redruth, read an interesting and valuable paper on "Dynamite in its Sanitary Aspect." The writer gave the preferon "Dynamite in its Sanitary Aspect." The writer gave the preference to dynamite over both guncotton and gunpowder as an explosive agent, not only on account of the additional work done, but because the products of combustion were less injurious to the health of the miners. He was satisfied from experiments which he had made that dynamite was not chargeable with all the physical evils laid to its account. He believed that the acroline generated was the head and front of the offending, in consequence of the irritation which it caused to the mucous membrane. Resignators which could

the head and front of the offending, in consequence of the irritation which it caused to the mucous membrane. Respirators, which could be supplied for a few pence, had been suggested as a remedy; and Dr. Gladstone thought some liquid ammonia might be sprinkled about the ends before blasting.—Dr. BARHAM and the CHAIRMAN spoke very highly of this paper.

A paper on "Old Glouers in South-West Cornwall," by Mr. F. Lloyd, of Birmingham, was read by Mr. Whitley.

The Rev. Dr. BANNISTER gave an interesting account of the latest discovered mirade play, that of 8t. Meriasek, to whom Camborne Church is dedicated, and whose festival is still kept up in that parish.

"Romano-British Remains discovered at Trelan, in the parish of St. Keverne," by Mr. J. J. Rogers. In this paper, which was read by Mr. Budge, Mr. Rogers gave an account of some Romano-British antiquates discovered at Trelan, St. Keverne, in 1833, in some graves, and described such as he had been enabled to trace. The most important was a bronze mirror, closely resembling in type those found in the ancient cemetary at Mount Stanford, and described by Mr. C. Spence-Bate, F.R.S. Mr. Rogers thought these discoveries militated against the theory advanced by Mr. W.C. Borlase, in his excellent work: "Nacia Cornubia."

In a second paper, read by Dr. BARHAM, Mr. Rogers gave the additional particulars which later research had enabled him to glean respecting Juhn de Trevisa.

Boyton Manor and Advowson and the Barton of Bradridge," by

"Boyton Manor and Advowson and the Barton of Bradridge," by W. Binkin.—The paper, in which the history and descent of the manor, bar-on, and advowson were traced, was read by Mr. Bidge.

"Ornithological Notes," by Mr. E. H. Rodd and Mr. N. HARE.—Mr. odd's paper has already appeared in the Journal of the Institution; and Dr. Addian, commenting on the former, pointed to the evidence afforded of the pro-ress westward of several birds which were formerly strangers to the county-tarlings had now taken to breed in the neighbourhood of Truro, and he thought we might yet hope to have the nightingale amongs them.

economic considerations; and showed the necessity of some means being devised or the protection when required of the early vegetable crops. It was only some of 12 nights in a year that such a protection was needed; and it could readily some given by called or netting, or in some such way. For want of such protection contains the could readily some such way. For want of such protection contains the such as the most generally rainy year since 1841.

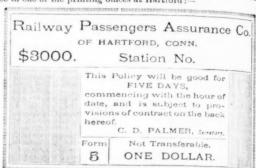
"The Common Seals of Cornwall," by Mr. R. N. WORTH. This common seal in the country, and of all the seals of the extinct religious and seals common seal in the country, and of all the seals of the extinct religious and seals corporations, of which either matrices, impressions, or records were known to exist, some were described for the first time.

In conclusion, votes of thanks were passed to the readers of papers and donor, and to Dr. Jago for presiding.

### CASTING METALS UNDER PRESSURE.

So much importance is now attached to artistic design in almost So much importance is now attached to artistic design in almost every branch of industry that it has become absolutely essential to dispense with expensive manual labour in the production of in the production of merable articles of ornament and utility in every-day use. In the various branches of the fancy metal trades this is particularly apported to the different kinds of brass and steel tools of complicated design an invention dispensing with highly paid art-labour can scarce over-estimated. Among the most important inventions of this class introduced for many years past, that for casting metals under pressure is probably entitled to the greatest prominence, since it promises as completely to revolutionise the system of metal-casing as the Bessemer process has revolutionised the manufacture of steel. Although castings sufficiently fine to be used without subscenting dressing or finishing for the machine tools now so generally seen

as the Bessemer process has revolutionised the manufacture of stell Although castings sufficiently fine to be used without subsequent dressing or finishing for the machine tools now so generally seen our workshops had been produced by Whitworth and others, the idea of turning out a medallion, a statuette, or any similar work of art from the mould, so highly finished that it could be sent into the market without further manipulation, had not been entertained uning Messrs. Smith Brothers, of Philadelphia, brought forward their is vention, the result of which was a success so complete as to lear nothing to be desired; the casting leaves the mould identical to the minutest particular with the pattern from which it has been taken so that in the case of a statuette or a medallion it has all the appearance of having passed through the hands of a skilful finisher. We are, of course, precluded from giving specimens of the castings theselves; but their excellence can readily be judged of from the fat that the subjoined copy of a railway assurance policy is printed from an untouched cast in brass made from a well-worn electro in actain use in one of the printing offices at Hartford:—



The engineers and others who have investigated the merits of the invention are unanimous in praising its simplicity and efficiency; and as it claimed to be equally applicable for bronze, copper, iron, or white metal, and to produce castings which require no skilled labour to finish them, it is not surprising that favourable reports have been made upon it. Thus, Mr. R. Mallet, M.I.C.E., F.R.S. reports have been made upon it. Thus, Mr. R. Mallet, M.I.C.E., F.R.S. reports that has examined a large collection of moulds prepared for casting, and of bronze and white metal castings of ornamental objects, exhibited to him in London on May 5, and that in soundness, sharpness to form of pattern, perfection and beauty of surface and finish, these castings, untouched by any tool after leaving the moulds, transcendamy he has ever seen; he was particularly struck by the reproduction thus in bronze of a paragraph in the most minute type of a stereotype plate, the pattern stereotype from which the casting had been moulded had been reproduced by stereotype. Comparing the pattern with the casting, it was impossible to discover any difference between them, even when examined with a lens. The production thus of large or small type stereotype, &c., in bronze, a material wearing so much longer than type metal does, and at a cost so much below that of electrotyping, ought to afford a wide field of future application for this method of casting. If applied to casting objects in phosphor-bronze and copper he has no doubtresults of great beauty and economic value may be obtained. He deems Mr. Smith's invention one likely to prove of great importance practically and commercially. Others who have examined the castings are equally satisfied, Mr. Henry Gardner, C.E., for example, writing that the samples which have been submitted to him and made by this process are in every sense equal to the finest specimen of skilled workmanship that he has ever seen. The facesand The engineers and others who have investigated the merits of the and made by this process are in every sense equal to the finest specimen of skilled workmanship that he has ever seen. The faces and hollows are well defined, the edges sharp and the projection smooth, so much so that he finds it difficult to distinguish between the or-

ginal and the copies.

In the examination of all processes of this class the first question which suggests itself to the practical man is whether there is any special difficulty in applying them; in this respect the present invention is certainly perfect, the most delicate filagree work leaves the mould with all the clearness and finish we are accustomed to the mould with all the clearness and finish we are accustomed to admire in the highest class of Berlin iron jewellery, and if the subject be a salver, a medallion, or the copy of some complicated design in bronze, it is difficult to imagine that it has not been long in the hands of an experienced chaser. Yet the process by which these excellent results are obtained is so simple that there would be no inconvenience in introducing it in any Birmingham factory, and every workman, lad, and girl would be quite competent to carry on the several portions of the process. The copy from which the casting is to be reproduced is simply covered with a layer of composition consisting of fine clay and kaolin, and laid at the bottom of the moulding box, which is filled up with a kind of terra cotta or similar suitable backing. The ram of a screw press is then brought to bear, and the contents of the mould-box being compressed to about one-third of its thickness, the mass is formed into a hard tile, in the face of which the impression of the pattern is obtained. The sharpness of this mould surpasses anything but a steel die, and hence the castings sbtained from it might readily be mistaken for work turned out by the die-sinker, although the number of minutes occupied in producing the mould would be fewer than the die-sinker would occupy weeks in making a similar die, the difference of cest would occupy weeks in making a similar die, the difference of cost tem permitting, moreover, of the design being reproduced in metal

of any desired thickness, and of any degree of hardness.
The production of the mould has, of course, much to do with the quality of the finished casting, yet not more so than the mode in which the casting itself is effected. The channel communicating between the mass of molten metal and the gates of the casting is closed by a plug, behind which the molten metal itself is contained in a cylinder. The ordinary pressure of the metal in the cylinder does not remove this plug, but upon the compressing pixton being brought into play the plug is forced to the end of the channel opening the communication with the whole sevice of months. To secure ing the communication with the whole series of moulds. To secure the freeing of the molten metal from any air it may contain the compression of the mass is commenced before communication with the hopper through which the cylinder is filled is cut off, and the thorough reaching of the containing the containing of the containing the containing of gress westward of several thris which were formed by the starlings had now taken to breed in the neighbourhood of Truro, and he thought they might yet hope to have the nightingale amongst them.

The Barham then proceeded to comment upon the meteorology of the district, laving especial stress upon the investigations made by Mr. W. P. Dynamic into the sea temperature at Falmouth, and the thermometric observations of Mr. R. W. Fox, on the ground temperature at Penjerrick was than the temperature how much lower the ground temperature at Penjerrick was than the temperature from the chamber containing them, and all is ready for repeating the recorded at the Falmouth Observatory. This was a most important point in its

as it is perfect, and it is not unjustifiable to conclude that ere long it will be, for the production of the better classes of work, the only it will be, annhoved. thod employed.

### FOREIGN MINING AND METALLURGY.

German coal continues to flow into Belgium to a sufficient extent German coal continues to flow into Belgium to a sufficient extent to produce a serious competition with Belgian coal, and to encourage to produce a serious check which the Belgian coal trade has expended. The aspect of the Belgian coal trade remains generally proceed. The same, but it is felt that the period of reaction is close at much the same, but it is felt that the period of reaction is close at much the same, but it is felt that the period of reaction is close at much the same, and if an attempt is still made to support prices with this price attempt is not characterised by any vigour. Coke is Thus, other is a statempt is still made to support prices with at his season, and if an attempt is not characterised by any vigour. Coke is timess, this attempt is not characterised by any vigour. Coke is timess, this attempt is not have more than doubled in the first sown by official statistics to have more than doubled in the first formonths of this year, having risen to 63,000 tons, as compared for months of this year, having risen to 63,000 tons, as compared with 30,000 tons in the corresponding period of 1872. The greatest with 30,000 tons of this year was derived from the Zollverein, which stem months of this year was derived from the Zollverein, which stem months of this year was derived from the Zollverein, which stem in the corresponding period of 1872. These 16,000 with 500 tons in the corresponding period of 1872. These 16,000 with 500 tons in the corresponding period of 1872. These 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 these 16,000 with 500 tons in the corresponding period of 1872 the second of 1872 these 16,000 with 500 tons in the corresponding period of 1872 the second of with the commencement of the great movement of the gas represented the commencement of the bas represents. The imports of coal into Belgium from the Low is few months. The imports of coal into Belgium from the Low is few months, and France have also been increasing this year, contries, England, and France have also been increasing this year, that not so large an extent. The exports of coal from Belgium in the introduced in the first two months of this year exhibited a rather sensible decline, the first two months of the Azollverein declined cresponding period of 1872. The exports to the Azollverein declined to the extent of 3000 to the extent of 3000 tons, those to Holland to the extent of 3000 to the extent of 3000 tons. The exports of fillolland now supplying itself almost exclusively in the Ruhr 1880 tons in the first two months of this year, as compared with 18800 tons in the corresponding period of 1872. The augmentation 18800 tons in the corresponding period of 1872. The augmentation whole, it would seem that there has been a sensible diminution in whole, it would seem that there has been a sensible diminution in the exports of coal from Belgium, and that Germany has been profit the property of the property of the property of the state of the property during the last few days a dividend for 1872 at the rate the exports of confirm benefitting and charler of Collieries Company has ing in consequence. The North of Charleroi Collieries Company has been paying during the last few days a dividend for 1872 at the rate

see paying the first state of the french coal trade has not materially changed.

The aspect of the French coal trade has not materially changed. of 188. Per suator of the French coal trade has not materially changed—froluers maintain their prices, consumers keep back their orders, and there is little or no business doing. The dead season has, under these circumstances, set in with unusual severity. For the moment prices have not varied, but they are nearly nominal, as scarcely any business—or, at any rate, comparatively little business—has been passing. Household qualities of coal are, as usual at this season of the year, much neglected, and prices are falling. Railway traffic is being coducted very regularly in France, as many trucks as are required are forthcoming, and too many delays are not experienced. Transports by water do not present equally satisfactory results, although here, again, a sensible improvement is indicated. The production food in the basin of the Loire in 1872 amounted to 3.400,000 tons; of this production 2,400,000 tons were raised in the St. Etienne duction focal in the basin of the Loire in 1872 amounted to 3 400,000 tons; of this production 2,400,000 tons were raised in the St. Etienne basin, and 531,000 tons in the Rive-de-Gier basin. There were 91 plk in activity in the basin of the Loire last year, and the number of persons employed was 17,500. It would thus appear that the strange production in the Loire group last year was 200 tons per miner employed; this average was much higher than the corresponding average attained in Belgium. It is right to remark, however, that as compared with Belgium coal mining in the Loire is conducted upon somewhat different conditions.

The downward movement in the Belgian iron trade has become more decided, or, at any rate, it is more general. Prices are not

medicate upon somewine tin the Belgian iron trade has become more decided, or, at any rate, it is more general. Prices are not weaker, upon the whole, than they were at the close of last week, but they are more easily agreed to by producers. It is true that some of the latter still present a show of resistance, but these are firms which have still plenty of work, and they form the exception and not the rule. Some small transactions have been concluded at 121 per ton, but in large transactions the more general quotation is 111 the per ton. Consumers maintain an attitude of considerable reserve, and they appear to be justified in doing so, as a return of activity is much less probable as regards iron than as regards coal. Balls bring 121, per ton, and plates 161, per ton. As regards pig, it would seem that previous rates have been about maintained. The imports of iron into Belgium increased to 35,000 tons in the corresponding period of 1872. The augmentation proceeded almost entirely from England, which sent Belgium 30,000 tons in the first two months of this year, as compared with 15,000 tons in the corresponding period of 1872. The increase of 15,000 tons in the corresponding period of 1872. The increase of 15,000 tons observable in the English imports in the two first months of this year was made up English imports in the two first months of this year was made up thus:—Rough pig and old iron 8000 tons, and rails 7000 tons. The increase in the imports of iron into Belgium from England is, of increase in the imports of iron into Belgium from England is, of course, attributable to the extremely high prices which have prevailed upon the Belgian markets. The exports of iron from Belgium in the first two months of this year presented a slight increase, having been 35,700 tons, as compared with 33,500 tons in the corresponding period of 1872. The exports to the Zollverein presented as augmentation of 1000 tons this year; those to England an increase of 1000 tons; those to Brazil an increase of 1000 tons; those to Spain an increase of 3000 tons; and those to Italy an increase of 5000 tons. On the other hand, the exports to the Low Countries presented a diminution of 2000 tons; those to Austria a diminution of 8000 tons; and those to the United States a diminution of 2000 tons; and those to the United States a diminution of 2000 tons. of 3000 tons; and those to the United States a diminution of 200 tons. Upon the whole, the increase in the exports this year was comparatively trilling, and it proceeded entirely from old contracts which were not renewed. MM. Delexhy, Geradon, and Co., have been authorised to extend the resources of their works at Jemeppe by the ablitton of eight puddling-furnaces, two pile-hammers, a rolling-mill, flye steam-hollers. &c.

Prices have been maintained in the French iron trade more firmly than might, perhaps, have been expected. Confidence has been regained to some extent, but, nevertheless, the advices received from the Hout. gained to some extent, but, nevertheless, the advices received from the Haute-Marne indicate great uncertainty in prices. Merchants' ion is quoted in the Haute-Marne between 12.4 and 12.16s. per ton, and casting pig between 64.8s., and 71.4s. per ton. More transactions have been concluded at the lower than at the higher rates; but, upon the whole, there has been no great amount of business passing upon any terms. In the Nord, No. 2 iron has made 12.4 to 12.8s. per ton, and plates 164.16s. to 174.4s. per ton; the market is characterised as heavy. In the markets of the Centre of France prices have been supported better than in the North and North-East; this is attributable to the fact that the Centre of France is less subject to the influence of foreign movements. Everywhere, however, the state of the French iron trade is much less favourable than it was a month since. Some forgemasters in the neighbourhood of Maubeuge have, it is said, been under the necessity of partially extinguishing their furnaces and dismissing some of their workpeople. A similar state of things has been noticed in Belgium, and it is attributable to the a similar state of things has been noticed in Belgium, and it is attained to the same cause—the impossibility of making the reductions required, having regard to the level at which raw materials are still maintained. The iron trade both of France and Belgium, will clearly suffer a good deal if coal maintaine its high price for any length of time, as it is this high price of coal which prevents indispensable concessions being made. For the moment consumers appear to be stronger than producers. The Liverdun Forges Company states that it expects to commence puddling Pourses. The Company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to commence puddling Pourses. The company states that it expects to ductions required, having regard to the level at which raw materials are still maintained. The iron trade both of France and Belgium will clearly suffer a good deal if coal maintains its high price for any length of time, as it is this high price of coal which prevents indispensable concessions being made. For the moment consumers appear to be stronger than producers. The Liverdun Forges Company has contradicted a statement that its works are not making progress. The company states that it expects to commence puddling in August, and that it has collected the necessary plant. The management of the Marquise Works has commenced the extraction and preparation of ferruginous minerals, which will be carried by special steamers to the Pas-de-Calais in order to be treated there. MM. R. Bilaage and Co. have made arrangements for working the Sauve-

mill, five steam-boilers. &c

has made 93l.; ditto in ingots, 98l.; and Corocoro minerals, 96l. per ton. There has been comparatively little business passing in copper at Havre, and no improvement can be reported in copper at Marseilles. In Germany the copper markets have exhibited a certain amount of stagnation, and prices have shown a slightly downward tendency. Tin has been declining at Paris; Banca has brought 15ll.; Straits, 149l.; and English, 149l. per ton. The Marseilles tin market has been also drooping. The German tin markets have been generally weak. At Paris lead has been tending upwards, in consequence probably of the falling off in the imports. French lead, delivered at Paris, has brought 24l. 12s.; Spanish ditto, delivered at Havre, 25l.; English ditto, 24l. 16s.; and Belgian and German, delivered at Paris, 25l. per ton. At Marseilles, however, lead has slightly given way. In Germany the article continues to be maintained with the same firmness as for some time past. At Paris there has been very little business doing in zinc. Silesian, delivered at Havre, has been quoted at 28l. 16s.; other good marks, 28l. 16s. per has made 93%; ditto in ingots, 98%; and Corocoro minerals, 96% per Havre, has been quoted at 28% 16s.; other good marks, 28% 16s. per ton; and ditto, delivered at Paris, 29% per ton. The Marseilles market has remained without change; rolled Vieille Montagne zinc has realised 36% per ton. The German zinc markets have been generally pretty well supported.

### FOREIGN MINES.

Total sinking 7 0 5
This progress is not equal to that of February, but it is explained by the state of he pit work in shaft A, where an injured windbore is retarding the work, and by the heavy timber work that is being put in; while in shaft B the ground has been excessively hard. hard.  $\mathbf{A}$ ,  $\mathbf{A}$ ,  $\mathbf{H}$  appears that the sump of this shaft is becoming to layers of broken ground seem to be receding from the vertical  $\mathbf{h}$ 

eneral establishment, and the sinking of the vertical shafts prosecuted without nuch delay and with fair results.

PRODUCE.—The very limited amount of sand now available, and that being of poor quality, has not given the opportunity of extracting any produce worth recording. The produce for the month of March amounts to only at Morro Velho, 764: and at Fernam Paes, 143-7 oits.

At Morro Velho, the costs for March for labour and other charges, less sums received from road contracts, Rs. 2595 §440, exchange 26\(\frac{1}{2}\)\(\ 369.5, at 8s. 6d. per oit. £ 157 0 9 

Outlay in March beyond receipt ....

 Outlay, March—Sinking, timbering, and pitwork, Rs. 11,599 \$082, at exchange, 26½d.
 £1292 16

 Mineral tramway, &c., Rs. 5310 \$321, at exchange, 26½d.
 591 17

VERTICAL SHAFTS .- From the measurement made the sinking for the

Total depth .....  $\begin{array}{cccc} 1 & 2 & 5 \\ 2 & 0 & 0 \end{array}$ 

Total, 15 days ... 3 2 5 form delay in sinking was necessarily caused by the erection of a plunger set pumps in the shaft A, otherwise the sinking would have been quite up to the average. The small quantity of mineral treated from that raised at the new shaft appear to give a very small gold return, though the experiment is a yet so limited would be scarcely justifiable to come to any conclusive opinion thereon. The although the equal bishment continues good. The gold troop left Morro Velho April 11 with one box, containing two bars, weighing 1146 cits., equal to 10:57 lb troy. This was shipped per Boyne, and has duly reached the Bank of England.

DON PEDRO NORTH DEL REY .- Report for March: Produce and

DON PEDRO NORTH DEL REY.—Report for March: Produce and Co-t: Produce, 611 ozs. troy, at 8s. 6d. peroit., 2252/18s. 6d: cost, 8688, at 26\( \)4d. per milreis, 3331/. 16s. 8d: [loss, 1128]. 18s. 2d.—First Division of April: Produce weighed to date, 1317 oits: remittance, 11,009 oits. The works throughout the mine have progressed with usual regularity. During the last two weeks we have driven through the No. 6 lode in the 30 fm. cross-cut, and the samples taken were of the most encouraging character, being occasionally nearly rich enough for boxes. The lode at this point is large, and, on the whole, of very fair quality. We commenced on Monday last to make preparations to resume sinking operations, which we hope to do towards the latter part of this month or the beginning of next.

ROSSA GRANDE.—Report for March: The cost for the month amounts to 888/. 4s. 3d.; the total daily average force has been 151-1. The cost is higher than for some months past, owing to increase of force, higher exchange, and unusually high price for provisions. All operations in the mines and at surface have progressed with regularity, and the prospects continue to be very good. The gold-obtained from samples taken during the month has amounted to 4½ oits.—First Division of April: Estimates of backs laid open during February—Bahu, 53 ms. 6 in, at 10 tons of ore per fathom, 530 tons 16 cwts. 2 qrs. 18 bs.; mineral stocked, 190 tons: 639 tons 16 cwts. 2 qrs. 18 bs.; imieral stocked, 190 tons: 639 tons 16 cwts. 2 qrs. 18 bs.; per ton—5112 oits, of gold.—Cacheeira: 25 fms., at 6 tons per fathom—168 tons, by 8 oits, per ton—1344 oits, of gold.—Cacheeira: 25 fms., at 6 tons per fathom—168 tons, by 8 oits, per ton—184 oits, of gold.—Cacheeira: 25 fms.

GENERAL BRAZILIAN.—Capt. Thos. Treloar, April 14: Our works GENERIAL BRAZLIIAN.—Capt. Thos. Treloar, April 14: Our works generally are progressing apace, all points are now in good working order, and before end of May I hope we shall have reached several shoots of gold both at 8t. Anna and Itabira. Upon all matters I have written the plain truth, and I shall continue so to do, so I must advise now that as regards the lode at 8t. Anna, I am so far disappointed, but this may not impair the final result. The winze below the old adit—referred to in my letter of 14th ultimo—was sank 5 fathoms 3 feet, but no old workings nor jacotinga showing gold were met with, though at bottom of said winze very kindly-leoking jacotinga was touched; choke-damp arrested further progress; but the result was so contrary to what I expected, that doubt arose whether any of our operations had really reached the main layer of the auriferons bed of jacotinga. Hearing of the whereabouts of practical men who had worked here, I sent for them, and conversing with same on the spot, they informed me that the auriferous bed at 8t. Anna was not auriferous throughout like that at Itabira, that the gold was almost wholly concentrated in the shoots, that the shoots were different layers in the bed, and that riches may be close to our works. If this betrue, not finding gold as I expected is no indication of poverty. They confirmed the information I had when I first reported upon the property, that Matto's group consisted of sevenshoots; but said that three were rich and four comparatively poor. At Conceion we are working merely to retain legal possession, but even so we may hit upon something.

nd the inflow of water, that I have resolved so far to deviate from my plans as to asket be experiment above intimated. If I obtain good results, prepare to build our mill, and consider the future of I. X. L. secure. The shaft is now down 146 fa. EXCHEQUER (Gold and Silver).—Lewis Chalmers, April 28; I regret ery much I cannot report more favourably than I have done for some weeks as to

your mill, and consider the future of I. X. L. secure. The shaft is now down 146 ft.

EXCHEQUER (Gold and Silver).—Lewis Challmers, April 28: I regret very much I cannot report more favourably than I have done for some weeks as to our rate of progress in the shaft: only 4 ft. were made, and the rock is as hard as ever. When at the mine on Friday I gave orders to have 200 tons of the ore on the dump (upper works) sent down the schute to the ore platform, so that when the mill is ready I shall fry results with about 300 tons; my foreman tells me to-day he cannot do so without another car, which I have sent or.—Mill: During the week the three carpenters were engaged: two at completing sluices for sand tanks, and the remainder preparing foundation for turbine. I have let the cutting of the logs for saws at \$1.50 per 1000. No offer for hauling. The engine-shaft is down 59 ft.

at is down 59 ft. Uтан (Silver Lead).—Telegram: "Struck fresh body of ore. Red

arrior looking well.
HOLCOMBE VALLEY (Gold).—J. Haley, April 24: Mammoth incline, No. 1, is now down 93 ft.; it has been very hard rock to work through, but it is now changing for the better: the ledge is 3½ ft. wide, and the ore is of a much higher grade than when I wrote you last. Mammoth incline, No. 2, is down 88 ft.; at this point the ore is very rich, showing great quantities of free gold, and much a ster ground; I am now sinking this shaft by contract. I have started work on the Pine Tree lode; this ledge is narrow, averaging 8 inches, but the richest of all so far. The mines altogether are developing a much better class of ore than I expected.

s fter ground; I am now sinking this shart by contract. I have started work on the Pine Tree lode; this ledge is narrow, averaging 8 inches, but the richest of all so far. The mines altogether are developing a much better class of ore than I expected.

BUNKER HILL (California),—W. L. Palmer, April 29: In the 70 level we find plenty of ore. The great body of metal-bearing ore is unexhausted, and extends from the 70 to the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over \$150,000. In south end of the 170 level, and the 70 level has already yielded over than the 170 level has already yielded over \$150,000. In south end of the 170 level has already yielded over than the 170 level has already yielded over the 170 level has already yielded over the 170 level has already yielded yiel

Harvey and Company. When they arrive I will erect more at Thornhill, when our returns will be greater, with much less cost in proportion to that at present.

NEW ROSARIO.—Mineral del Monte, April 11: Since the Providencia shaft was drained we have been able to keep the water down with tease. The metal we are raising shows a decided improvement, and the next 20 cargas assayed will, I hope, give a much higher average. In order to open the lode as much as possible, I removed the four men from the Rosairo north end, and have now six pare driving on the Providencia lode. In the Providencia lode. In the Victoria winze we have 7 varas more to sink; we still obtain ores of very fair lev. Lust week I had one that assayed 11 murks 25 cents. of silver, and I mark of gold to every hundred marks of silver. Last week our metal was put into the patio and I hope in another three weeks we shall have the silver; I am only wai inguntil I can send away 200 cargas more to be reduced, in order to ship the whole of the silver at once. Capt. T. Nicolls, one of the Real del Monte company's captains, visite lour mines y esterday, and was greatly pleased with all that he saw, pating visite lour mines y esterday, and was greatly pleased with all that he saw, pating visite lour mines y esterday, and was greatly pleased with all that he saw, pating but in the Providencia lode, which he says is superior to anything he has seen in the country. He and the head captain of the Real del Monte Company has been in the rovidencia.

Capt Copper.—The report of the engineer, Mr. R. T. Hall, on the Port Nolloth Railway and Jetty for 1872 states that 428-94 tons of oue, material, and goods were carried up, and 90294/2 tons of ore, regulus, and metal brought down. The working expenditure was 21,4804, which was excessive, owing to the uncertainty of being able to keep the engines steadily at work, necessitating keeping a stock of mules equal to the power of the two engines. They have more than a stock of mules equal to the power of the two engines. They ha

sion in Cape Town.

WEST CANDAL.—April 21: Huron Copper Bay: The stope in the ck of the \*0, cast of Bray's shaft, will yield 2 tons of copper ore per futhorn. A per in the bottom of the 35, cast of the same shaft, yields 2½ tons per fathorn; a mather in the bottom of this level, west of Palmer's shaft, yields 5 tons of ore

sberg.-J. W. Hoffman, May 17: In the open-cast the north

and another in the bottom of this level, west of Palmer's shaft, yields 5 tons of ore per fathom.

Bensberg.—J. W. Hoffman, May 17: In the open-cast the north vein of carbonate is producing very good ore; we got about 40 tons from it this week and the remainder from the west vein. In general there is no alteration. We fixed the washing trommel, connected the two boilers with the steam-engine, and are now fixing the steam-pipes for the new pump. I have forwarded a plan of the proposed bridge to the consulting engineer, and shall put it in work as soon as it has the approval of the directors. Our contract with the Stoblerg Company epiring at the end of May I enclose their proposals for a renewal of the same. Production of ore for the week, 50 tons of 45 per cent. assay, and 20 tons of 10 per cent. assay. Delivered, 60 tons of 45 per cent. assay, stook on hand (ready for market), 40 tons of 45 per cent. assay, Stook on hand (ready for market), 40 tons of 45 per cent. assay, Stook on hand (ready for market), 40 tons of 45 per cent. assay. Stook on hand (ready for market), 40 tons of 45 per cent. assay, Stook on hand (ready for market), 40 tons of 45 per cent. assay, Stook on hand (ready for market), 40 tons of 45 per cent. assay.

FORTUNA.—May 7: There is no improvement in the 110, west of Henty's shaft. The lode in the 100, west of Judd's shaft, is small, and less productive than it was, yielding ½ ton of ore per fathom. The lode in the 50, west of 8an Pedro shaft, is strong and firm, with good stones of ore. The 69, west of 8an Pedro shaft, is arrived and the strong and shaft per good of the 50, cast of San Pedro shaft, is resumed. The lode in the 90, east of Add's shaft, is large, with stones of ore, but not enough to value. In the 80, west of Kennedy's shaft, the ground is hard for driving, and the lode unproductive. The lode in the 90, west of Lownde's shaft, is moderately easy for driving, but does not contain any lead. The 80, east of Caro's shaft, his moderately easy for driving, but does not contain any le

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made show it to be of excellent quality. Its proximity to the coal beds adds to its value, and also the fact that the ore and fuel can be transported from the mines to the valley entirely by n

SMELTING IN UTAH .- Within the past two years 20 smelting-works SMELTING IN UTAH.—Within the past two years 20 smelting-works have been erected, containing altogether 30 blast-furnaces, six r-verberators and ore separating and redning works. These are capable of producing 114 tons of base bullion daily for 300 days per annum, or a total product of 43,200 tons. In view of the quantity of ores exposed within an area of 600 square miles, embracing Big and Little Cottonwood, American Fork, West Mountain, Toole and Ophir districts, consisting chiefly of argentiferous galena and carbonate lead ores, ranging in value from 30 to 60 per cent. lead, and 15 to 75 ozs, of silver per ton, which can only be converted into commercial value by the smelting process, the establishment of an economic metallurgy becomes a question of the greatest importance, and, in orther to solve this problem of paramount interest to Urth, the first and most important procedure in such an enterprise is to secure ability of the highest order—men was are thoroughly masters of their business. Without this an enterprise of such majority of the failures are to be attributed to the lack of necessary skill at the start. In future operations it is to be hoped that, when once engaged in, there will be a positive knowledge that success will be guaranteed through the employment of that class of professional skill which knows no such word as fail.

CHICAGO (Silver).—We learn from good authority that the ore

CHICAGO (Silver).—We learn from good authority that the ore odies in this remarkable mine increase in size and rapidly improve in quality as reater depth is attained. The Chicago promises to be one of the finest mining reperties in Utah. Already more ore is exposed than the owners have facilities or extracting, and we believe it is contemplated to employ steam-hoisting works an early date.—Sait Lake Duby Tribune, April 22.

at an early date.—Salt Like Duly Tribune, April 22.

COLORADO CENTRAL.—The lots of ore from this celebrated lode which have been crushed by G. W. Hall and Co. during January, February, and March, 1873, show an average value per ton of 968-6 onnees, or 81225-50—ingher, we believe, than the average of any other silver mine in the world, when as in this case, all the grades of ore are calculated upon. Three lessees are working on the vein, which has yielded at times at the rate of 81000 per day. The ore is an argumentiferous galena, containing gray copper, brittle native and ruby silver, and silver glance. At times the latter is so prominent that the ore will not pass through the crusher, but flatters out like a soft and malleable metal. Mr. Linn showed us a specimen not long since that weighed not over ten pounds, which was estimated from assay to be worth about 870. It consisted almost entirely of silver glance.—
Colorado Manay Review.

SALE, OF THE CENTRAL MANY.

From assay to be worth about \$75\$. It consisted almost entirely of silver glance. 
Colorate Many Review.

Sale Of The Caribou Mins.—For some time past A. D. Breed has been negociating the sale of the Caribou Mine, not only the portion owned by him, but also the east half, owned by the original discoverers, Messes, John H. Pickle, William Martin, Hugh McCammon, George Lytle, and Samuel Miehler, and of the resluction works at Midlel Boulder. Of late the negociations have been conducted with parties in Holland through M. Anker, formerly of Denver, and U. S. Marshal Shaffenburg. The sale has now been perfected, and the property changed hands yesterday, possession being delivered to Mr. Shaffenburg, the Coorado director. The new owners are the Nederland Mining Company, composed of capitalists in Holland, where the company was formed, Messes A. L. Sowille and Co., of New York, Mr. Breed, Mr. Shaffenburg, Mr. Anker, and others. The price paid is three millions of dollars, but part of the purchase price was received in the stock of the company. This property was purchased after careful examination by the company's own engineers, and has at former times been examined by Messes Taylor and Son, of Lori lon, and also by Messes, E. E. Waters, of England, all of whom reported all the way from two to four millions of dollars worth of ore in sight. The shipments of builton have constantly been large, as everyloods knows. Only yesterday nearly tweive thous and dollars worth of silver builton in bricks lay on the sile-walk for the president a party to step on as they dighted from the carriage at the Teller House. The monthly production of builton since the works have been in operation has been from \$33,000 to \$35,000, while the cent was only from the carriage at the Teller House. The monthly production of builton since the works have been in operation has been from \$35,000 to \$35,000, while the cent was only from the garding the production of a specific cent was only from the production of the specific cent was only trong the pr

BOLIVIA SILVER MINES. - With regard to the silver mines of Cara-

The Terrible Mine, as it stands to-day, is a credit THE TERRI and the hoisting track, are worthy of imitation in many a mine or more extensively worked. Upon the surfaces the main improvethe wire trainway leading from the dressing-rooms at the mouth 
the crushing and concentrating buildings in the gulch below. On 
tons per day can be transported, and machinery is now being 
reatment of third and fourth grades of ore, by which they can be 
a high value, and either shipped to Europe or treated in works.

Monte Review.

GOLD MINING IN VICTORIA.—The March accounts from Victoria

GUNCOTTON.-The value of guncotton as an explosive has been rations in progress at the Chemics resided over by Prof. Abel, to who which have hitherto been made i when soaked with moisture, it can be exploded with a detonating fuze just as readily as if perfectly dry. Following up this important discovery, the chemists of the War Department have brought to light some new andextraordinary properties peculiar to this explosive, and Prof. Abel has submitted to the Government a novel scheme. He proposes to use it for the bursting charges of shells, instead of gun-powder, the remarkable part of his plan being to fill the shells with water, in which a few skeins of the gunestton are placed. The latter, as already stated, may be fired by detonation, but by no other means, and it has been found on experiment that the combined action of the gunestton and water is to break up the shell into many fragments, so that common shell may be made almost as effective as Shrapnel. Prof. Abel even goes further than this, and proposes to use the guncotton and water mixed in solution to charge shells, and his projects are at present receiving the earnest attention of the officers who conduct such scientific enquiries on behalf of the Government.

Now even tree. Variously the investigation of the officers who conduct such scientific enquiries

dip of the formation is 40° to 45°, and seems to become more uniform the deeper the vein is mined. The deposit of red oxide of iron, in some portions of the vein, gives to it the appearance of a fine marble. Its discovery was made by its cropping out upon a quite extensive hill owned by a gentleman of the name of Barnes, who holds in this an independant fortune. The finest portion mined brings a large price, and is largely used by engravers. In the Cedar and Taney counties in this State (Missouri) the same rock is found, but no development has determined its extent, save surface specimens, which are not likely to represent the best rocks of the formation; as in the Arkansas Mine, the deeper it is mined, the more superior the stone becomes.—St. Lows Journal of Commerce.

### DESCRIPTIVE MINERALOGY.

DESCRIPTIVE MINERALOGY.

It is a fault observable in by far too many college text-books that, owing to the supposed necessity for following a strictly scientific arrangement, the author pays so much attention to systematising that the practical utility of the work to the student into whose hands it is placed is materially lessened, since it frequently happens that in the business of life we are compelled to group materials or facts in a manner widely different from that which scientific accuracy would dictate; and it is the recognition of this circumstance that so much enhances the value of the admirable volume of descriptive mineralogy,\* recently completed by Prof. Egleston, of Columbia College, New York. Written expressly for his own class, he has been careful to describe every species with which it is necessary for an engineer of mines to be familiar, or which present any peculiarity of interest; and, as it has proved useful to his own class, it is but reasonable to assume that it will be equally so to others studying for a similar purpose. The volume contains only the second portion of the course of lectures, the first part, comprising crystallography and physical mineralogy, being monised at a future time, but will be found highly valuable and useful to the student in the examination and determination of mineral species, and will give him much information not to be found in a collected form elsewhere.

The peculiar arrangement to which we have admeter as likely much to facilitate the student's progress consists in first describing hydrogen, sulphur, tellurium, carbon, boron, slicon, respectively: themaking the sitients, mislicates, and substitutes, and showing the groups comprisad under each head; and, after referring to the minerals of the zeolite and mangrophyllite sections, returning to the basic and antiverse of the progress of landness, in systematic order according to the content of the student connected with mining. The work comprises a careful classification of the species under the different cryst sition, localities, and, to some extens, or expansion profully executed plates of the figures of crystals, able peenliarity—the notation marked upon the end of classification is adopted in the body of the lers that both Dana's and Naumann's systems I understood, he gives in the text the notation at is recorded with the systematic name according to Naumann. To this there can be no posses of the figures of crystals the faces had been it would have been a great improvement. There for the systems used by Dana are preferable to be certain that Naumann's symbols for the forgous more perspicuous and less likely to be confused unbined arangement has its advantages, for it sure and very readily understand both systems, we considerable attention, we naturally turn to see

The information given with regard to each mineral is very complete, and from the arrangement adopted the practical man consulting the work will usually find precisely those facts which he is deing the work will usually find precisely those facts which he is desirous of referring to at the same time, conveniently grouped together—so that he will gain the knowledge sought with the atmost rapidity, and to mineralogists generally the table of comparative notation will prove invaluable. Its compilation must have involved much labour, but the author may fairly congratulate himself that his labour has not been lost. It is a task which we know more than one mineralogist has commenced, and if Prof. Egleston be not the first to have completed it he is certainly the first who has given the public the benefit of his exertions in that direction. As a text-book for students intending to devote themselves to business in after-life it would be difficult to say too much in praise of the volume.

""Lectures on Mineralogy." Delivered at the School of Miner, Co'umbia College. Descriptive Mineralogy. By T. Edderson, Professor of Mineralogy and Metallurgy. New York: D. Van Nostrand, Murray and Warren Streets.

### QUALITATIVE ANALYSIS.

QUALITATIVE ANALYSIS.

The simplicity and efficiency of the system of qualitative analysis so carefully described by Fresenius, has led to his manual being made the basis of all the best text-books on the subject which have since been published, and it would be difficult to say anything in higher commendation of a work of this class than that in it Fresenius is closely followed, whilst the instruction is given in language readily intelligible to the English student. With the advantage of a good memory, and a thoroughly competent teacher, the bare tables we were accustomed to some seventy years ago, as "Giessen Outlines of Analysis," would probably be ample, but it is indisputable that there are many students who, unless the text-book run very closely to the explanations given by the Professor, make comparatively little progress; and that facility to refresh one's memory as to the statements heard in the lecture-room is advantageous to all. The

when sorked with moisture, it can be exploited with a detonating fuze just as readily as if perfectly dry. Following up this important discovery, the chemists of the propose to up the important discovery the chemists of the perfect of the perfect

liquid or precipitate. Paper gummed on the back, or the small labels which are sold already gummed, are convenient for this use. This habit once acquired and carry on simultaneously without error confusion several a third, and dissolving a fourth at the same time, and the processes filtering long to as many different stages of the analysis. There will be no danger my be if labels are faithfully used, and a great deal of time will be no danger my be if labels are faithfully used, and a great deal of time will be no danger my be if labels are faithfully used, and a great deal of time will be no danger my be in labels are faithfully used, and a great deal of time will be no danger my be in labels are faithfully used, and a great deal of time will be no danger on in scientific research. Hints of this character occur in various parts of the book: Normandy is large works) will add to the facility with which the book can be used, large editions is of itself a guarantee that it is not wanting in utility or in reliability, and although the information given is necessary similar to that met with in other works of the kind, the manner in which it is given is well calculated to impress the facts which have to be remembered upon the attention of the learner, whilst the limit and suggestions, which are so complete as to extend even to the explanation of the best methods of removing a bottle-stopper, cleaning a mortar, and so on, cannot fail to make the student who has the book for his guide a clean and ready manipulator, and one that can at all times rely upon results which will be creditable to himself and satisfactory to those for whom the analysis is made.

### ELECTRICITY AND MAGNETISM.

ELECTRICITY AND MAGNETISM.

There are probably few sciences to which the public are deeply indebted, owing to their large contributions to the convenience and of electricity and magnetism; and, curiously enough, what has hithered been generally taught to the few who have sought an elementary knowledge of the subject has been so widely different from the knowledge acquired in practice that it has been thoroughly useless for enabling its possessor to comprehend even the bearings of the questions discussed by practical men at the British Association mediags, or any other assembly of a similar character. To provide a text-book shist is the object of the last issued volume\* of Messrs. Longmans Practical electricity as known to practice electricity as known to provide a text-book shist is the object of the last issued volume\* of Messrs. Longmans Practical electricity as known to provide a text-book shist is the object of the last issued volume\* of Messrs. Longmans of the thick of the control of the work. Of Prof. Fleening Jenkin's acquaintance with the subject it is needed to work. Of Prof. Fleening Jenkin's acquaintance with the subject it is needed to work. Of Prof. Fleening Jenkin's acquaintance with the subject it is needed to meet of the book it would probably be difficult to improve it. He explains that, plan followed in the book is first to give a general synthetical view of the science of the subject is the object in the subject is needed to be subject to the science of the science of the subject is the subject in the subject is subject in the follows—the description of the main phenomena are described, and the terms used explains that, plan followed in the book is first to give a general synthetical view of the science of the subject is subject to a plan what follows—the description of the apparatus used explains that points out that the difference between the electricity of schools and of the follows—the description of the subject is an additional to the subject is a subject to a plan what follows—the descr

sent 10° absolute units (centimetre, gramme Latimer Clark's standard cell is 1·475 volt. can be determined in absolute measure with more proposed of the proposed of the proposed of the 10,000,000,000 the of 10° absolute units mon use. The details given of these standanced not grant of the proposed of

on use. The details given of these standards are so complete that me suce sed not fear acquiring from the book a very satisfactory knowledge of the subje-The subsequent chapters of the work treat of galvanic batterie The subsequent chapters of the work treat of galvanic batteries, measurement of resistance, comparison of capacities, potentials and quantities, frictional electrical machines, electrostatic inductive machines, magneto-electrical apparatus, electro-magnetic engines, telegraphic apparatus, speed of signalling, telegraphic lines and faults therein, useful applications of electricity other than telegraphic atmospheric and terrestrial electricity, and the mariner's compass, so that the book, as a whole, forms one of the most perfect manulas that could be desired. It is altogether a volume which to those practically engaged in telegraphy will prove invaluable, whilst to the non-professional reader it will be highly interesting, and will give him information which is certainly well worth possessing.

\* "Electricity and Magnetism." By Fleening Junkin, F.R.S., L. and E.

\* "Electricity and Magnetism." By Fleeming Jenkin, F.R.S., L and E. M.I.C.E., Professor of Engineering in the University of Edinburgh. Leaden: Lougmans, Green, and Co.

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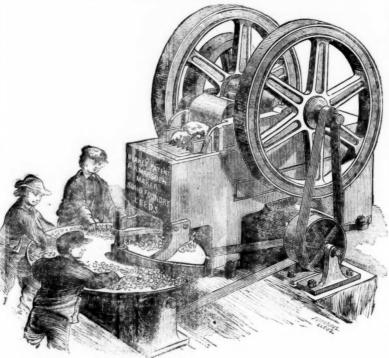
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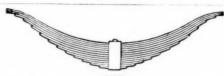
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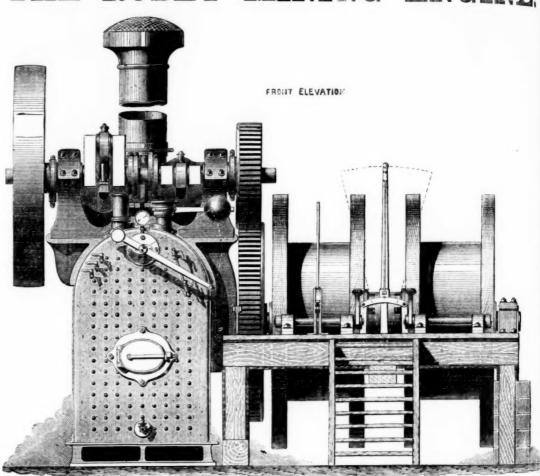
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In hard rock, like granite, gneiss, fronge, and in chest in chest in the incredible rate in chest in the incredible rate in the incredible rate.

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experience has shown that each is eminently suited for the work for which it is designed.

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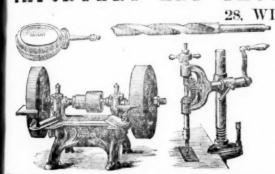
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WILSON, McLAY, & CO., 2, TALBOT COURT, GRACECHURCH STREET, LONDON. E.C.;

87, ST. VINCENT STREET, GLASGOW.

# CHARLES CHURCHILL AND CO., IMPORTERS AND FACTORS OF AMERICAN MACHINERY AND TOOLS,



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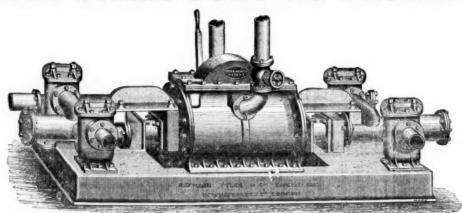
Morse's Twist Drill, and Machine Company's celebrated Twist Drills and Chucks; American Scroll Chucks; Stephens' Patent Vices; Parker's Patent Parallel and Swivel Vices; Gould Manufacturing Company's Well and Cistern Pumps; Washita, Arkansas, and Hindostan Oil Stones; and all other descriptions of American Tools and Machinery, &c., &c.

C. C. and Co. are prepared to give quotations and execute indents for American Goods of all descriptions, to be shipped to any

CATALOGUES AND PRICES CURRENT ON APPLICATION.



### HAYWARD TYLER AND CO.'S PATENT STEAM PUMPING MACHINERY.



contayer and a half since a direct-acting pumping-engine was erected at the Trimdon Grange Colliery by Messrs. Hayward Tyler and Co., of London-lameter of the steam-cylinder of this engine is 40 in., that of the rams 10 in., the pump-plungers having a 4-ft. stroke. The whole of the combined apparatus feel on a solid bed-plate, and the pumps are so arranged that they can be drawn off endways, if required, a planed groove being formed in the bed-plate to them true. A pumping-engine of this description requires no very accurate adjustment of level, as it is self-contained, and all the strains are direct from the cylinder to the murphs, which at their underside are attached to the bed-plate, and are supported by a strong stay above. The engine at the Trimdon Grange is not a broadway cut for its reception, at a depth of 400 ft. from the surface, and a short distance from the main shaft. The pump takes its water ser it was found that the pump was throwing to bank, a distance of 400 ft. above itself, 245/2 gallons of water per minute, the pump running at 10 strokes, long 59-5 per cent. of its theoretical duty."—See Engineering, 3rd Jan., 1873.

Full particulars, references, testimonials, &c., post free, on application to-

HAYWARD TYLER AND CO., 84 AND 85, UPPER WHITECROSS STREET, LONDON, E.C.

### McNIEL, MULLER, AND CO., 39, MARKET STREET,

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PIG IRON

AGENTS FOR JACKSON, GILL, AND CO., IMPERIAL IRONWORKS, NEAR MIDDLESBOROUGH; DARLINGTON WAGON COMPANY, DARLINGTON.

SCOTCH, HÆMATITE, STAFFORDSHIRE, DERBYSHIRE, FOREST OF DEAN, COLD BLAST AND REFINED PIG IRON, PUDDLED BARS AND BAR IRON, STEEL, SPELTER, TIN, COPPER, LEAD, SHEETS, ORES, BOLTS, NUTS, SPIKES, MANUFACTURED IRON, &c., &c.

### SOLID DRAWN BRASS BOILER TUBES,

FOR LOCOMOTIVE AND MARINE BOILERS,

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MINERS'

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MUNTZ'S METAL.
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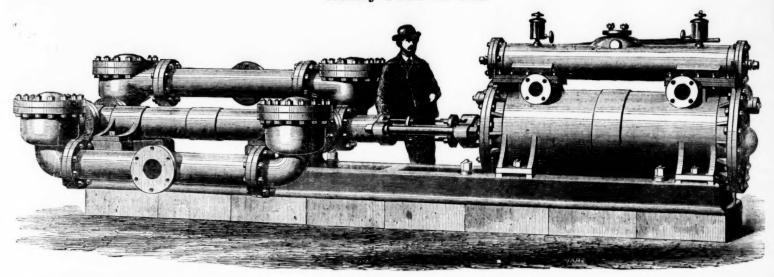
CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,

NEWCASTLE-ON-TYYE (TANGYE BROTHERS AND RAKE), OFFICES AND WAREHOUSE, ST. NICHOLAS' BUILDINGS. SOLE MAKERS OF

## DIRECT-ACTING STEAM PUMPING

FOR FORCING WATER FROM MINES.

Nearly 3000 in Use.



The "SPECIAL" Direct-acting Steam Pumping Engines require no costly Engine Houses or massive foundations, no repetition of Plunger Lifts, ponderous Connecting-rods, or complication of Pitwork, and allow a clear shaft for hauling purposes.

### Extract from "ENGINEERING," September 6th, 1872:

Diameter of Exhaust.

"The accompanying engraving illustrates a large specimen of the "Special" Steam Pump, which was brought before the public about four years since by Messrs. Tangye Bruthers and Holman. The Fump is the invention of Mr. S. Cameron, of New York, and since its introduction Messrs. Tangye have turned out nearly 2000 from their works.

"These pumps are of various sizes, and at first only small ones were made, but as their usefulness became developed the manufacture of the direction of the special state. They were first applied to this purpose in the Newcost Bate Mr. S. Stansfield Rake, under the direction of Messrs. Tangue for Messrs about three years since and through the efforts of the collieries about three years since and through the efforts of the collieries of the Durham and Newcastel districts, up to the end of 1870. They were adapted to perform the required duty—varying in almost every case—of forcing from 1000 to 1000 gallons per since hour from depths ranging from 100 to 500 ft. The success of this system on pump led Mr. J. Birlandt, the manufacture of the engine we have illustrated, for the Alelaide Collieries, belonging to Messrs. Pease, at Bishop Auckland.

"The construction of the Special Steam Pump is so well known."

"The "Spacial" Steam Pump is so well known."

The "Special	' Steam	Pumping Engines are in use at the following among many other Collieries:	
Adelaide Colliery, Bishop Auckland Acomb Colliery, Hexham Blackfell Colliery, Gateshead Black Boy Colliery, Gateshead Castle Eden Colliery Carr, W. C., Newcastle Etherley Colliery Gidlow, T., Wigan Haswell, Shotton and Easington Coal Company Lochgelly Iron and Coal Company Lochore and Capeldrae Cannel Coal Company Leather, J. T., near Leeds Lumley Colliery, Fence Houses Monkwearmouth Colliery, Sunderland	3 Pumps. 1 " 1 " 2 " 4 " 1 " 3 " 2 "	North Bitchburn Colliery, Darlington.  2 Pumps. Stott, James and Company, Burslem Newton Cap Colliery, Darlington.  1 Straker and Love, Brancepeth Colliery Normanby Mines.  1 Straker and Love, Brancepeth Colliery Normanby Mines.  1 Seaton Delaval Coal Colliery, near Newcastle Delaval Coal Colliery, near Newcastle Thornley Colliery, Ferryhill Pease's West Colliery 2 Thompson, John, Gateshead Pease, J. and J. W., near Crook. 5 Trimdon Grange Colliery Pease, J. and J., Brandon Colliery 1 Tulhoe Colliery Pegswood Colliery, near Morpeth 2 Vobster and Mells Colliery Pelton Fell Colliery Pelton Fell Colliery, Darlington 1 Widdrington Colliery, Morpeth Railey Fell Colliery, Darlington 1 Whitworth and Spennymoor Colliery Right Hon. Earl Durham, Fence Houses 1 Westerton Colliery, Bishop Auckland Skelton Mines 1 Wardley Colliery, Gatesheld South Benwell Colliery 5 Westminster Brymbo Coal Company St. Helens (Tindale) Colliery 1 Weardale Coal and Iron Company	1 " 2 " 1 4 " 2 5 5 5 1 1 2 5

### PARTICULARS OF THE "SPECIAL" STEAM PUMPING ENGINES SUITABLE FOR HIGH LIFTS IN MINES.

Diameter of Steam CylinderInches	6	8	10	8	12	16	10	14	18	21	14	18	21	26	16	21	1 5
Diameter of Water CylinderInches	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	
Length of StrokeInches	24	24	36	24	36	48	24	36	36	48	36	36	48	72	36	48	1
Strokes per minute	2.200	2,200	2.200	2.000	20	0.000	30	20	20	15	20	20	0.000	8,800	11 000	11 900	11.90
Height in feet to which water can be raised )	2,200	2,200	2,200	3,900	5,500	3,900	6,100	6,100	6,100	6,100	8,800	8,800	0,000	0,000	11,500	11,000	1
with 40 lbs. pressure per square inch of }	240	425	665	240	540	960	240	470	775	1.058	230	540	740	1.140	312	540	70
steam at pump						000		*10	110	1,000			1				
Diameter of Suction and Delivery Inches	2	2	2	3	3	3	31	34	34	34	4	4	4	4	5	5	
Diameter of Steam InletInches	. 4	11	$1\frac{1}{2}$	11	21	$2\frac{1}{2}$	13	21	3	31	21	3	31	4	21/2	34	
Diameter of ExhaustInches	1	1 ½	14	11	$2\frac{1}{2}$	3	13	$2\frac{1}{2}$	31	4	21/2	34	4	5	3	4	

PARTICULARS, &c.—Continued.																	
Diameter of Steam Cylinder Inches Diameter of Water Cylinder Inches Diameter of Stroke Inches Strokes per minute Gallons per hour	7 72	18 8 36 20 15,660	24 8 48 15 15,660	30 8 72 10 15,660	32 8 72 10 15,660	18 9 36 20 19,800	24 9 48 15 19,800	30 9 48 15 19,800	36 9 72 10 19,800	21 10 48 15 24,400	30 10 72 10 24,400	36 10 72 10 24,400	42 10 72 10 24,400	26 12 48 15 35,240	36 12 72 10 35,240	44 12 72 10 35,240	5 1 9 35,24
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump.	1,100	300	540	840	960	240	427	665	960	264	540	780	1,062	282	540	800	1,04
Diameter of Suction and Delivery Inches	5	6	6	6	6	7	7	7	7	8	8	8	8	10	10	10	1

PRICES OF THE ABOVE ON APPLICATION.

Any combination can be made between the Steam and Water Cylinders, to suit Height of Lift and Pressure of Steam.

& HOLMAN, 10, Laurence Pountney Lane, London, E.C.